Volume IX Number 7

Plastic Products

September 1933

In this Issue—

Plastics as Glass—Molding Costs—New Pyroxylin Finishes—Alpha Cellulose Analysis

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Plastic Products

VOLUME IX NUMBER 7

Fall House Cleaning

NO RESPONSIBLE executive in any branch of the various plastics products industries but recognizes only too well that competition has been unfair and unprofitable during the past two years. The sharp-shooting tactics differ in the celluloid, the molding, and the coatings fields. The larger, stronger firms employ different bad practices from those used by the smaller companies. But in each field competition is over-keen, and as a group, few industries in the country more thoroughly demoralized. No need to review the causes or to itemize the unfair methods employed.

Although to date the N. R. A. has been almost wholly concerned with hours and wages, once these are settled it is opportune for the plastics industries to turn their attention to the problems of making their trade practices more just to competitors and less discriminating among customers. There are some encouragingly plain indications that such efforts will not be discouraged by the Administration. General Johnson has recently reiterated his belief that chiseling has been bad business, and while he is still firm in his opposition to price fixing by any industry, nevertheless he acknowledges that unfair competition has brought prices too low, and if continued might wreck the re-employment plans. Even this partial return to the early promises of relief to industry from one of the most serious results of the depression is enheartening.

These recent expressions from the N. R. A. headquarters point the way to efforts sorely needed in plastics fields. Clean up competition and prices will take care of themselves. That is General Johnson's advice. It is deadly true, and the procedure is certainly sounder than any attempt prematurely to raise prices which would only make greater opportunities for foolish or unscrupulous sellers.

The job before our four new plastic trade associations this fall is to clean house. This is even more than a great opportunity, it is a dire necessity

Plastics as Glass

A Summary of Illumination Characteristics

By Alfred Paulus and C. Scott Woodside*
Commercial Engineers, Westinghouse Lamp Co.

GROWING use of plastics for luminous architectural elements indoors and for lighting fixtures, makes a study of their possibilities and limitations desirable not only for the architect and the illuminating engineer, but for anyone interested in the development of the newer uses of plastic materials.

Manufacturers divide plastics into two groups depending upon the processing required to form the finished product. Those in the thermoplastic group may be formed many times into definite shapes by the application of heat and pressure, while those in the thermosetting group after being once molded and cooled cannot be changed by additional heat or pressure.

For practical use in the purposes of this study it is more convenient to classify plastic materials in terms of light-transmitting properties as clear, diffusing, and opaque.

1. CLEAR—those plastics which transmit light without any sensible diffusion.

*Based on a technical paper read at the 27th annual convention, Illuminating Engineering Society, at Lake Delavan, Wis.

Figure I

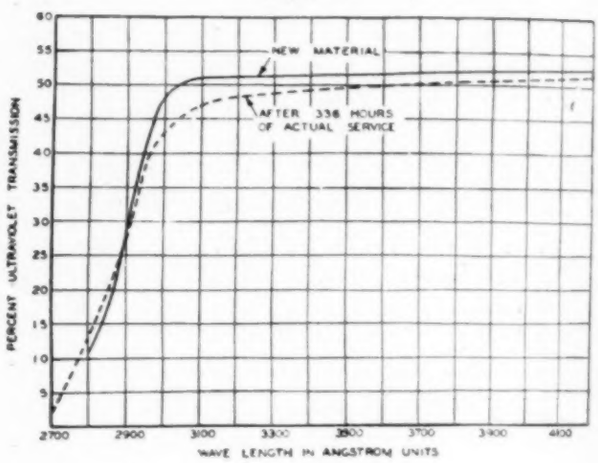


TABLE I — Physical Properties

Characteristics	Phenolic Resin		Urea Formaldehyde	Cellulose Nitrate	Cellulose Acetate	Vinyl Resins	Styrol Resins
	Asbestos Filler	Wood Flour					
Molding Qualities	Very Good	Excellent	Good	Good	Good	Good	Good
Effect of Heat Dry	Withstands constant use at 190°C	Withstands 110°C	Not recommended for continuous service above 65°C or intermittent service over 120°C	Decomposed at 100-150°C	Discolored at 160-200°C Decomposed at 200°C	Darkens slowly at 150°C	Will soften under high heat
Effect of Heat Moist	Withstands constant use at 190°C	Surface roughened due to absorption	Slight absorption and swelling	Decomposed at 100-150°C	Softening temperature considerably lower than in dry heat 80°C	Darkens slowly at 150°C	Will soften under high heat
Burning Rate	Practically incombustible	Very low	Very low	Very high	Low	Nil	Will not support combustion
Effect of Ultra-Violet Light	Slight darkening	Darkened	None	Discolored and brittle	More stable than nitrate		Slight surface oxidation
Effect of Aging	Improves mech. and elec. properties	Not appreciable	None	None in absence of U. V.	None	None	None
Softening Point	None properly cured	None properly cured	Does not soften Decomposed at 160-170°C	75 - 90°C	70 - 110°C	70°C	90 - 95°C
Light Transmission	Opaque	Opaque	Opaque to transparent	Opaque to transparent	Opaque to transparent	Opaque to translucent (Molded form)	Opaque to transparent

2. DIFFUSING—those plastics which, by means of a cloudy composition or by means of surface treatment, diffuse all or part of the incident light.

3. OPAQUE—those plastics which transmit an inappreciable amount of light or none.

A list of the general classes and specific products together with a table of properties follows:

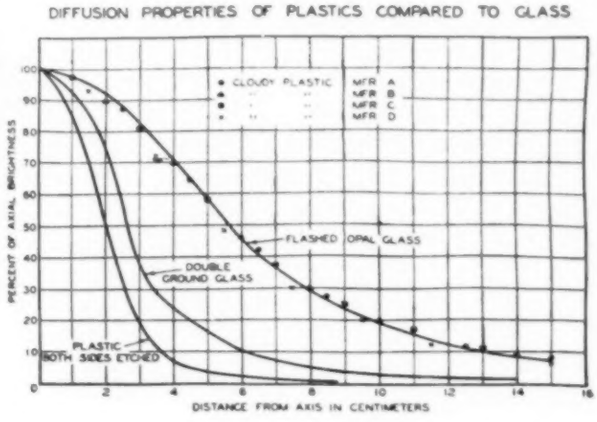
Thermoplastic Types

Chemical Classification	*Specific Products*
Cellulose nitrate	Celluloid
	Fiberloid
	Pyralin
Cellulose acetate	Fibestos
	Plastacele
	Lumerith
	Tenite
Vinyl resins	Vinylite
Styrol resins	(No special product)

Thermosetting Types

Phenol-formaldehyde	Bakelite
	Plaskon
	Micarta
Casein-formaldehyde	(No special product)
Glycerin-othalic acid products	(Glyptal)

Figure II



Practically all of the organic plastics may be produced in the clear form and find application as laminations for shatter-proof glass, for windows, in chemical plants and airplanes, for decorative displays, and for photographic film. As noted in Table I some of these plastics transmit ultraviolet radiation, and are therefore of interest as window material for sun parlors and sanitariums. No doubt they will some day figure prominently in lighting fixtures designed to provide artificial sunshine for

Figure III

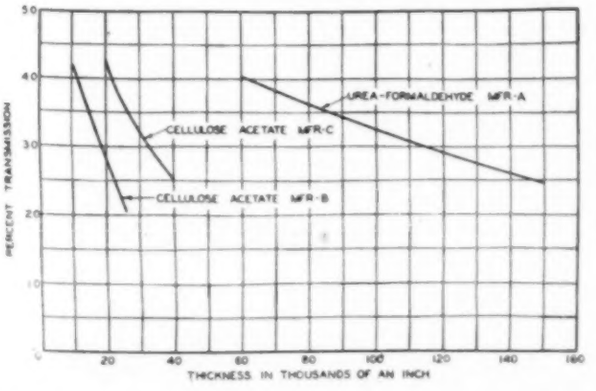
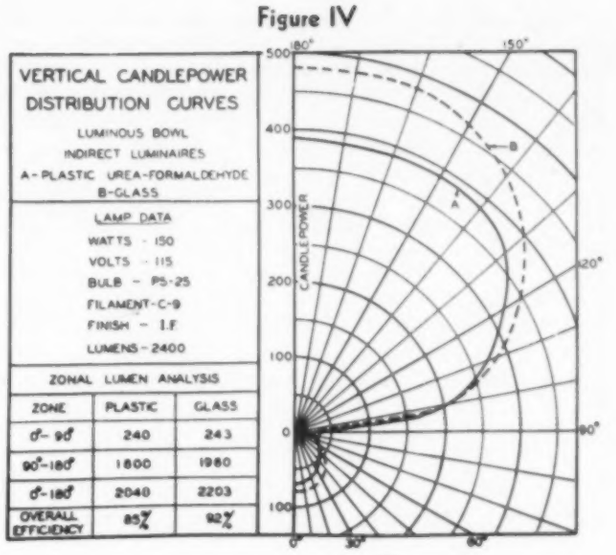


Figure IV



offices and homes. Fig. 1 shows the permanence of the ultraviolet transmitting qualities for a sheet of vinylite.

Diffusing properties may be incorporated in plastics by two methods: First, by the addition of pigment which produces a cloudy appearance similar to that of opal glass; and, second, by means of surface treatment such as acid etching, sandblasting, or by the impressing of configurations.

Since organic plastics resemble glass in appearance and illuminating properties they are suitable for similar uses. The diffusing properties of several glasses and plastics are compared in Fig. 2. As may be seen from these curves, plastics can easily duplicate the results to be obtained with glass in regard to diffusion. However, it is only fair to differentiate between the quantities of light transmitted by the different materials. The wide variation in transmission noted in Table II is due to the kind and quantity of pigment used, as well as the actual size of the pigment particles. How the transmission of the cloudy-type plastic depends upon the thickness is illustrated by the curves in Fig. 3. In general as the diffusing property is increased the transmission is reduced and the reflecting properties increased.

TABLE II

Transmission Factors*

Material	*Condition*	*MFR.*	*Samples Tested*	*Range in Transmission*
Cellulose Acetate	Cloudy	D	21	.02 to .42
Cellulose Acetate	Cloudy	C	12	.25 to .40
Cellulose Acetate	Cloudy	B	3	.15 to .33
Cellulose Acetate	Cloudy	E	1	.16
Urea-Formaldehyde	Cloudy	A	8	.03 to .35
Urea-Formaldehyde	Cloudy	F	1	.55
Casein-Formaldehyde	Cloudy	G	1	.46
Solid Opal Glass	Cloudy		3	.34 to .60
Flashed Opal Glass	Cloudy		3	.40 to .68
Cellulose Acetate	Configurated	D	2	.56 to .82
Cellulose Acetate	Etched	C	2	.80 to .80
Acid Frosted Glass	(One Surface)		1	.73
Double Ground Glass			1	.60

*Light source used had color temperature of 2859° Kelvin.

TABLE III

Reflection Factors

Material	*MFG.*	*Samples Tested*	*Range in Reflection*
Cellulose Acetate	D	22	.41 to .92
Cellulose Acetate	C	12	.46 to .63
Cellulose Acetate	B	3	.46 to .52
Cellulose Acetate	E	1	.55
Urea-Formaldehyde	A	8	.48 to .86
Urea-Formaldehyde	F	2	.44
Casein-Formaldehyde	G	1	.50
Magnesium Carbonate			.98
White Plaster			.85
Porcelain Enameled Steel			.75
Aluminum (polished)			.68

Novel displays and unique decorations in lighting installations may be obtained with diffusing plastics where the temporary nature of the installation does not warrant expensive glass forms.

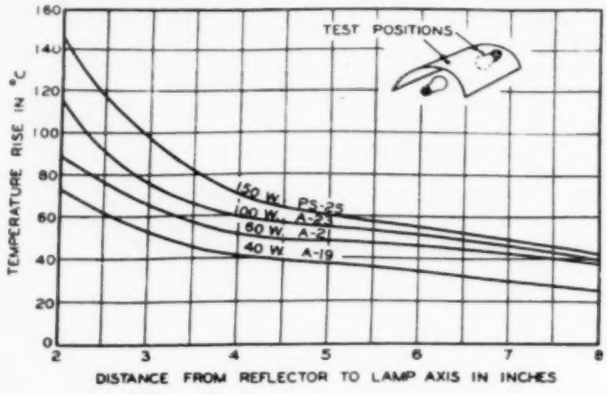
Different color combinations may be produced by using colored lamps behind white diffusing material. Diffusing plastics can also be used for lamp shades, wall brackets, and built-in lighting in cars, buses, and buildings.

Plastics which transmit little or no light fall into the opaque class and serve as good reflecting media. The reflecting properties of plastics and of other materials commonly employed in lighting fixtures are compared in Table III. An analysis of this table suggests that plastics may be widely employed as reflecting equipment in indirect portables, suspended coves, and indirect bowls. A candlepower distribution curve for an indirect bowl of a plastic material is shown in Fig. 4, and compared with a curve for one of the better type of glass units.

The temperature which the material will withstand is an important consideration in the use of plastics as lighting equipment.

Figure V

RELATION OF LAMP POSITION AND WATTAGE TO TEMPERATURE RISE IN A PLASTIC REFLECTOR.



The relation between temperature, lamp wattage, and the distance between lamp and reflector is shown in Fig. 5. The material used was a white translucent 30-gage plastic having an absorption factor of .16, a reflection factor of .48, and a transmission factor of .36. These figures of course apply to the particular set-up as shown which illustrates one of the worst conditions that might be encountered. Had the equipment been reversed, that is, the lamp placed above the reflector as would occur in a suspended cove, the temperature developed would have been just one-third as high.

Of particular interest is the fact that the light weight of all these plastic materials permits the design of a much lighter supporting framework. This item of weight is also an important factor in reducing shipping and handling costs.

Because of their good molding qualities and because they can be made in a wide range of reasonably stable colors, plastics products are already being used for many applications closely related to the lighting industry, such as switchplates, outlet receptacles, and hangars for fixtures.

Future Uses for Plastic Materials

From the evidence before us it seems that we are approaching the end of the age of metals; their place will be taken by plastic materials. The stage has already been reached when the strength of plastic products, weight for weight, is comparable with that of steel and iron. By reinforcing plastic materials with fibrous matter the day might come when it would be possible to produce materials not only as strong as, but considerably lighter than the metals now used in industry and for domestic purposes. It is possible that in the future entire bodies for motor-cars of fireproof material would be made in one piece. The same might apply to yachts and other craft, which would lend themselves to a similar process of production. We look forward to the day when 99 per cent. of aircraft will be constructed of fireproof plastic materials, so that disasters, such as happened recently, of air liners catching fire when in flight could never be repeated.

For domestic purposes plastic materials are already in daily use. There are, however, enormous possibilities of expansion. The housewife of the future will have her drawing room panelled with sheets of laminated materials of any color she might choose. Mankind loves variety and in the future it will be possible, when it was desired to redecorate the house, simply to replace the panels by those of another color. There would be no need for continual cleaning and polishing. The plastic products would not only be fire-proof, but scratch-proof and unstainable. The whole tendency of modern decorating is towards simplicity. Large flat surfaces of color replace the ornate styles of decoration which were the glory of the Victorians. Plastics lend themselves essentially to such treatment.

Rare and high grade natural products for art and decoration purposes are running short and there is every possibility of plastics replacing them. Every year sees the increasing use of substitute materials, and looking far ahead there is no reason why one day the stage will not be reached when even the framework of a house might be made of plastic instead of metal.

At the present time there is a movement towards simplicity in design, but this will be followed by a period of gradual introduction of accessory ornamentation. Plastic materials lend themselves to imaginative treatment and the artist of the future has great possibilities in these new plastic products as did ever the masters in the past in plaster and wood.

Manufacture of Domestic Ware

Referring to the utilization of plastics in the manufacture of domestic ware, there is no reason why in the future cost of production should not be so small that each article, after having been used once, might be thrown away and replaced by another. This would particularly apply to cups, saucers, etc. In the manufacture of furniture the craftsman will in the future exercise his skill and art on the production of a mold possibly weighing several tons to turn out simple, clean and efficient furniture. Alternatively, standardized parts for the construction of furniture would be molded and the fitter would come into play to assemble these parts into finished chairs, tables and other things. The internal fittings of liners and ships are already being changed in view of recent fires, and cabin fittings of fire-proof plastic sheets are being used extensively. The designs and finishes of the sheets are illimitable. Further, in plant and equipment where metal is detrimental, plastics are in use. Parts of equipment in dye plants have been rendered in plastic material.

All Glass Synthetic

It is also reasonable to look forward to all glass being made of synthetic transparent plastic which is less brittle and liable to splinter, and a better heat insulator. Glass so constructed requires less fuel to heat it. "Why should not window frames with transparent plastic for glass be molded complete in one operation?" Plastic combines lightness with strength and the consequent reduction of weight in any construction shows either cheaper initial cost or cheaper running cost. That might equally apply to the construction of houses, cost of running of ships, trains, cars and aeroplanes. The noise of running machinery, the clashing of gears in motor cars, and the deafening noise of the tube train might in future be reduced to a minimum by the introduction of plastics into their manufacture.—Abstracted from *The Chemical Age*.

This Month's Cover

Something new in serving trays—a plastic product molded in Bakelite material, which provides a strong but light in weight tray, into which are molded gayly colored illustrations making the whole a distinctive novelty. These trays can be produced in a wide variety of colors and are marketed by the Bell Mfg. Co.

Estimating Molding Cost

A Review of English Practices

By A. G. Snell*

The chief elements in making up an estimate for custom molding are precisely the same as the elements of cost as generally interpreted, namely, direct or productive materials, direct or productive labor, and overhead charges.

From a sample, sketch or adequate description of molded articles there is little difficulty in estimating the amount of direct material required and experience allows us to estimate what allowance to make for waste or flash which is included in the estimate as a percentage on the total material used. The matter of direct or productive labor, also, is not very difficult to compile and is best listed under either process or operation headings; which headings should be printed on the estimating form in full so that none of them are overlooked. From these two elements we derive the prime cost, and now comes the most difficult calculation, namely, overheads.

There are at least five methods of recovering overhead charges in common practice, and it is very necessary that the person responsible for their application should thoroughly understand their compilement, and keep constant check to ensure their accuracy and adapt percentages in accordance to their fluctuations. It is at this stage of estimating where many go wrong, and lack of knowledge of what exactly constitutes one's overheads is responsible for much of the undercutting in prices on the one hand, and failure to secure one's quota of orders on the other.

It is useless sounding round until you hear what percentage your competitors are using and trusting to Providence that if you use the same percentage you will be all right. Your competitor may be enjoying privileges such as freehold premises free from encumbrances; he may be possessed of more modern plant than you; he may be enjoying a different labor rate than yours; or alternately, he may be saddled with expensive capital loans, heavy rental, high rating, and additional expense in many directions. All these items contribute to the varying percentages of overhead charges even among firms engaged in identical industries.

It therefore behooves us to compute exactly our own overhead charge total, and endeavor by efficiency in every department and careful exercise of economy to keep the expenses down as much as possible. The basis upon which you recover your overhead charges will largely be determined by local circumstances. For example, some firms recover their charges by adding a percentage upon direct or productive labor, others may recover through machine hour rates; others again upon a manual hour base. In determining which of the methods you do adopt, consequence should be shown to the basis which is most consistent.

The works estimate form may be divided up into five main headings—(1) dies, (2) material and powder, (3) operations, (4) waste, and (5) total works cost per 100 articles. Under the heading of "dies" there is number required or impression, steel, sundry purchases, productive wages, tool-makers overheads, and maintenance of dies during the manufacture of the moldings. Under "material and powder" there is weight per 100 in lbs., cost of powder per lb., fittings molded in, and fittings used on assembly. Under "operations" there is weighing, pressing, drilling, fettling, grinding, polishing, lacquering, and assembly. Against these operations the productive wages are calculated per 100 articles, plus the percentage of overheads on productive wages, which then gives works expenses. Under the item "waste" there is materials, fittings, productive wages, and works expenses. When this is calculated we get the cost of the die, the cost of maintaining the die during its pressing operations, the cost of powder per 100 moldings, the cost of productive wages per 100 moldings, the cost of our works expenses per 100 moldings, and the cost of our waste per 100 moldings. We have now only to add profit and special agents commission, or selling cost, to get a complete estimate of the molded article.

Great care must be taken to ascertain the customer's requirements and his weekly requirements, which is governed by the number of impressions that can be designed in the die. The customer should always be willing to accept modifications to his design that will help him to get a satisfactory article, uninterrupted delivery, and an article at the lowest possible cost. When these points are thoroughly threshed out to the satisfaction of the customer and ourselves, it is possible to design the die. All articles except those of a small and robust nature must be studied with a view to ascertaining the correct material to use. You may find that the material for one particular article will be best made in the same powder that you already use for another in large quantities, and will therefore enjoy a minimum price; should you require a special material, a slightly increased price may result.

If this matter is considered at the estimating period, it not only safeguards prices, but ensures that it is tackled in good time when you are fortunate enough to commence production. The question of fittings (inserts molded in) must be considered very carefully. Unless the operations are studied along these lines it often happens that inserts are the cause of considerable scrap, and slow up production more than any other factor.

The most economical form of weighing for quick curing jobs is undoubtedly the tablet, but care should be taken to ensure that preformed material is suitable for producing the finished product. For slow curing work the operator has ample time to weigh up during the period of the cure, and if this is the case weighing is merged into the second process under the heading of pressing. On tool design, and press design, depends the easy handling and speedy operation of the mold, remembering that, particularly on multiple dies, a minute saved may gain the order, or a minute lost may lose the profit. The cost of drilling and fettling are in most cases easily ascertained and a glance at records of similar work verifies the figures. Grinding is one which we should endeavor to avoid, and only resort to when it is found absolutely necessary. The manufacturing aim should be clean-cut work, leaving the die as near to the finished state as possible.

*From a paper read before the Midlands Section of the Plastics Institute.

New Pyroxylin Finishes

By Edward W. Ward
Asst. Director Sales, Sheet, Rod & Tube Division, Celluloid Corp.

SINCE the invention of "Celluloid," over sixty years ago, the pyroxylin plastic industry has furnished only a very small percentage of sheet material with other than the unfinished, polished, or matt surfaces. During the past six months, however, there has been an increasing demand for special finished sheets. As in the development of new color effects, these new finishes simulate the products of nature, such as the skins of animals and reptiles, the stag horn, the weaves of fabrics, as well as being produced in various geometrical designs.

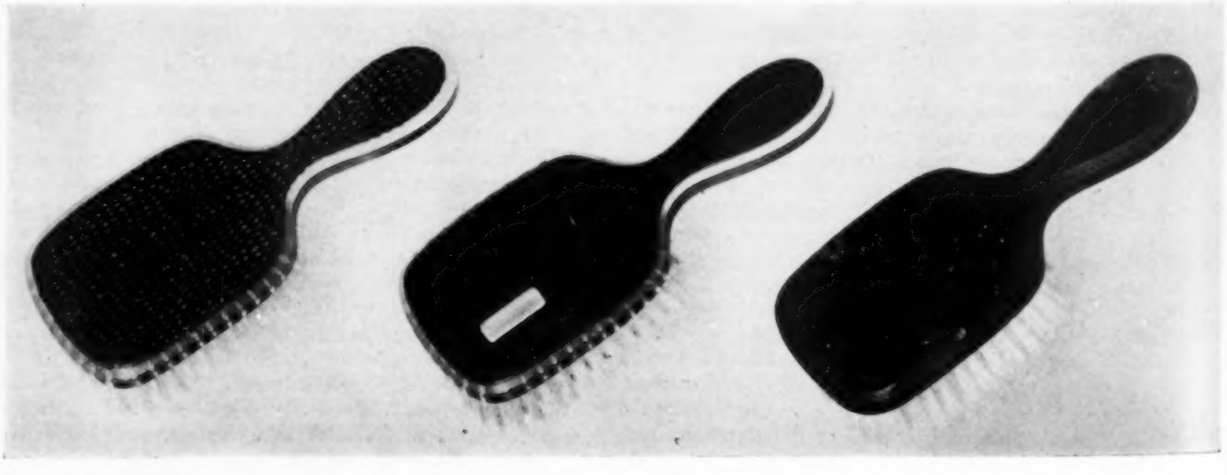
The application of these finishes to pyroxylin plastics is by no means new to the industry. Matt finishes, as obtained from the use of sand blasted finishing plates, have been popular for many years for printing and similar work. Today matt finishes are being furnished in various degrees of fineness for X-ray mounts, drawing, tracing cloth, mimeographing, lamp shades and other allied uses.

As in the case of the matt effects, finishes imitating those of fabrics are now being used in greater volume and for more diversified purposes. The oldest of these is the linen finish, as used for many years in the manufacture of the "Celluloid" collars and cuffs. With the exception of the linen, fabric finishes were very seldom utilized until a few years ago. At that time plastic sheets of the slow-burning type were being used quite extensively in the manufacture of lamp shades. At first, pale translucent colors with a matt finish for the diffusion of the light were used. In an effort to create newness, many beautiful effects were produced by the application of moire, crepe de chine, and other fabric finishes to the sheets. Now fabric finishes are being used not only in the manufacture of collars, cuffs and lamp shades, but also in guimpes, blotter covers, dance programs, and for similar decorative work.

Probably the most popular of the special finishes at the present time are those imitating the many fancy grained leather effects. Some years ago, in order to meet demand for a patent leather covered heel which would not scratch, scuff or mar, the progressive shoe manufacturer adopted the use of polished black pyroxylin sheets in the covering of heels. While heels covered with grained leathers had the same inherent weakness as the patent leather heel, it was found difficult to produce grained leather finishes on pyroxylin plastic materials which would be retained through the covering operation. This obstacle was finally overcome, and leather finished pyroxylin sheets are now replacing the many fancy grained leathers, such as kid, pigskin, snake, etc., in the covering of heels.

Of more recent date is the increasing use of sheets finished with conventional or geometric designs. While finishes of modernistic pattern have been popular mostly in the manufacture of lamp shades, the real impetus toward the increased use of these effects has come from the button and novelty industries, within the last six months. In the past, these industries used only the highly polished sheets, obtaining the ornamental effects by the pressing or cutting of the individual article. Today they are using sheets embossed not only in the grained leather effects but also in futuristic and geometrical designs. By doing so, not only have costs of manufacture been lowered, but it has made possible the producing of ornamental effects heretofore not procurable. Buttons, buckles, hat and bag ornaments, and myriads of other ornamental novelties are now being manufactured from these embossed finished pyroxylin sheets.

Several years ago, special finished sheets were used for only a few purposes. Today we find them being employed in the manufacture of toiletware, jewelry, penknife handles, advertising matter, lamp shades, wood heels, buttons, ornaments, etc.—practically in every field where pyroxylin plastic sheets are used.



Brush on extreme left is representative of the stag finish which is being used quite extensively in men's toiletware articles, handles of pocket knives, as well as buttons and novelties.

The Art of Resin Manufacture

By John P. Dunne
Durium Products (Great Britain) Ltd.

MAKING a synthetic resin has often been described as an art as well as a science. Indeed, in the preparation of many resins on the market today, especially those of the quick-setting type, real artistry is required particularly in viscosity determinations. Certainly more than a mere formula is needed to produce satisfactory results.

In very many instances knowledge of proper physical conditions of the reaction is as vitally important as the formula itself. There must be not only a careful analysis of the raw materials used but also a careful control of the temperature, pressure, humidity, time of reaction, viscosity, etc.

Variations in the physical conditions under which the reaction is carried on produce resins of various properties ranging from hard, brittle products to gummy, viscous masses. Many of these have their individual uses; the hard, brittle resins, in molding powders; the soft, gummy masses (dissolved in organic solvents) in varnishes or lacquers.

The chemist engaged in resin formulation must first determine the type of resin best suited to a particular purpose. He must then develop a formula and decide upon those physical conditions of reaction best calculated to give the desired product. It should be remembered, however that skill in the preparation of one type of synthetic resin by no means presupposes a similar ability in the production of resins of another type. Each type of resin has its own methods of preparation and its own chemical and physical problems. Let us consider a few of these problems as applied to the most popular type of resin, namely, the phenol-formaldehyde.

A typical formula consists of phenol, formaldehyde, catalyst, filler, color, and mold lubricant. The phenol and formaldehyde usually in equimolecular proportions with about 1-3% of a catalyst, such as hydrochloric acid or aqueous ammonia, are introduced into a steam jacketed reaction vessel. The mixture is heated until the reaction has started, at which point it is often necessary to shut off the steam and circulate cold water as the heat generator is great enough to cause a violent ebullition unless kept under control. When the initial reaction has subsided, the temperature is maintained constant until samples drawn from the bottom of the vessel show the proper viscosity. The resin is then allowed to run into shallow pans and cool. Afterwards it is pulverized; mixed with the required fillers, color, and mold lubricant; and passed several times between rollers, which are usually gas or steam heated, until the mixture has become thoroughly homogeneous. It is then allowed to cool and harden, afterwards it is pulverized and ground to a fine powder and is ready for molding.

The process seems a simple one. But brief experience shows that the kind, quality, and quantity of the material used as well as the technique employed has a profound effect upon the quality of the finished product. Let us consider first the raw materials used and the necessity for a careful control of their compositions.

Phenol derived from coal tar, from gas retorts, and from coke ovens has as its principal impurities ortho-cresol, naphthalene and pyridine. Ortho-cresol reacts much slower than phenol with formaldehyde. Thus when ortho-cresol is present part of the material will have reacted fully while the remaining part (the ortho-cresol) will not have reacted. This effect results in unreliable molding powders. Naphthalene, if present, tends to give the molding powders an objectionable creosote odor. It also tends to have a plasticizing effect upon the finished resin. Pyridine, being of an alkaline nature, has a catalytic effect. If an alkyline catalyst is used this effect is increased, but if an acid catalyst is used, the pyridine will tend to neutralize some of the acid, thereby reducing the catalytic value.

Formaldehyde is a gas with a characteristic odor. It is sold commercially as a solution of the gas in water, called 40% (by volume) formaldehyde. The solution contains 36-37% formaldehyde by weight, 10-12% methyl alcohol, a small amount (0.2%) of formic acid, and the balance water. Obviously it is quite necessary to know the amount of formaldehyde present in the solution to be used for the reaction with phenol. Also, a minimum formic acid must be present as it will not only affect somewhat the catalyst and consequently effect the speed of the reaction, but it will also affect the properties of the finished resin. Excess of formic acid is more often found in formaldehyde which has been stored for a long time in metal drums. Another troublesome impurity sometimes found in formaldehyde solution is copper. Most commercial formaldehyde is made by the partial oxidation of methyl alcohol. Vapors of methyl alcohol and air are passed through heated copper tubes packed with copper turnings, the metal acting as a catalyst in the conversion of the methyl alcohol. Volatile copper salts sometimes form during this process and pass over into the formaldehyde solution and, unless detected and removed, they are present as an impurity in the commercial product. Should the phenol used contain an appreciable amount of pyridine, the copper combines with it forming a bluish green dye.

Fillers are added to a resin to (a) improve the hardness, elasticity, and electrical resistance of the resinoid (b) reduce the contraction which occurs on cooling (c) reduce the cost per pound of the resin. It is essential that the proper filler be used to impart to the resin the characteristics required for the purposes for which the resin is intended. Also, the filler or fillers used should be free from contamination as the impurities contained in the fillers may be opposite in effect to that of the filler itself, or they may have an adverse catalytic effect on the resin. Of importance also is the use of the correct amount of filler. Too much filler not only will nullify the purpose for which it was intended, but will invariably result in ununiform flow of resin in the mold and, consequently, produce molding of low mechanical strength.

Selection of the proper catalyst is of vital importance in the production of synthetic resins for any purpose. Inorganic acid

catalysts usually result in thermoplastic resins which have a definite use in varnishes and also in certain molding processes where subsequent wet mixing with dyes or fillers is desired. Usually the resins used in the production of molding powders are made by processes using alkaline catalysts, either inorganic bases or their alkaline salts such as the sulfite or carbonate. As a rule, the alkaline salts are to be preferred as their reaction goes further to completion and takes less time. When a more gentle catalytic action is desired, some of the organic amines or their salts may be used. Since the effectiveness of any catalyst is directly proportional to the quantity and concentration used, it is plainly essential to use a catalyst of constant composition if uniform results are to be expected.

The mold lubricant facilitates the separation of the molded article from the mold. It may be either rubbed into the mold before the pressing operation or it may be included in the molding composition. The latter course is the most convenient where time is a factor. If an excess of the mold lubricant (usually stearic acid or one of its salts) is present, a "sweating" effect will appear in the molded article, because the lubricant is usually not miscible with the resin composition and the excess separates from the hard molded part. An excess of some types of lubricant also has a plasticizing effect causing too great a flow of the resinous composition in the mold.

Phenol-formaldehyde resins are now marketed in practically every color and shade except white. The coloring agents used are generally pigments. Spirit soluble dyes are sometimes used, but these are usually unsatisfactory owing to the fact that they are either heat fugitive or darkened considerably under the high temperatures used in pressing operations. Sometimes the fillers used, such as certain mineral substances have a pigmenting effect which eliminates the necessity of using a separate coloring agent. Where pigments are used it will be found that by grinding in oil a better and more uniform result is attained, provided that the oil is miscible with the resin composition.

Various Processes Employed

The processes of making phenol-formaldehyde resins vary with each manufacturer. Phenol may be substituted by any of its homologs such as resorcinol or cresol or the xylenols or by substituted benzenes containing hydroxyl groups, such as naphthols, etc. Resorcinol and meta-cresol have a relatively high velocity of resin formation and the resultant resins are of a rapid curing nature. Ortho and para cresols tend to form resins which are fusible and soluble and which require prolonged heating for hardening. Such resins are valuable for use as plasticizers with phenol, resorcinol, and meta cresol resins which are usually quite brittle. Resins formed from the xylenols have found less extensive application because they are relatively insoluble in alcohol and benzene. Meta-xylenol is used as a plasticizer in certain phenol and cresol resins.

Formaldehyde may also be substituted by any of its polymerides, such as paraldehyde or paraformaldehyde and their combinations, or by other aldehydes such as acetaldehyde or butyraldehyde and their combinations. Paraformaldehyde, due to its relatively high cost, is seldom used save in those processes where the presence of water has a deleterious effect. Paraformaldehyde or hexamine are sometimes incorporated in molding powders and act as hardeners. Acetaldehyde and butyraldehyde find use chiefly in the preparation of soluble and fusible resins for the varnish and lacquer trades. Acetaldehyde polymerized in the presence of caustic potash has found wide application as a substitute for shellac.

Various proportions of phenol and formaldehyde may be used. An excess of phenol has a plasticizing effect and tends to make the resin softer; too great an excess results in a soluble and fusible product. On the other hand, the presence of insufficient phenol tends to the formation of hard brittle products.

Many acidic or basic catalysts, both organic and inorganic, and of varying proportions of each, may be used. The number of compounds which have a catalytic effect in condensation processes is very large. In general, acidic catalysts form fusible and soluble resins while basic catalysts tend towards infusible, insoluble products. Within certain limits, the rate of reaction is directly proportional to the amount of catalyst present. The reaction rate of each catalyst varies, but the highly ionized inorganic catalysts have high rates of reaction while the relatively unionized catalysts have low reaction rates. Care should be exercised in the use of new catalysts unless their effect upon the speed of reaction has been previously determined.

An insufficient amount of formaldehyde may be employed and the deficiency made up by the addition at the end of paraformaldehyde or hexamethylenetatramine (also known as hexamine or hexa powder).

The physical conditions of the reaction such as temperature pressure, time, and viscosity, may be changed to yield resultant variations in the product. For example, increased temperature assists the action of the catalyst in accelerating the rate of reaction. This means, not only a decided economy, but also a greater uniformity of product. However, if the temperature is raised too high, the reaction may become violent. The ideal is a temperature as high as possible without allowing the reaction to get beyond control.

Viscosity Determination

Viscosity measurements are taken to determine when the reaction has proceeded far enough and to prevent the reaction from going so far as to convert the resin into the final hard resite stage. The viscosity at which the reaction is concluded, is a matter of experience and varies with each process. Theoretically the higher the viscosity, the lower the curing time in the molding process. But the viscosity can not be carried too far because:—

(1) It becomes difficult to draw out the resin from the reaction kettle.
(2) A definite time of flow is necessary in a molding powder in order to attain perfect molding.

All things being constant, the time of reaction in any one process should always be the same.

In general, assuming a proper control of raw materials it is usual that most of the trouble in synthetic resin production is caused by the reaction taking place under variable physical conditions. Herein lies the art of resin compounding which is not found in the textbooks or the patent specifications.

Urea Resin Stoving Finishes

The initial water soluble condensation product of urea and formaldehyde (when reacted in the proportion of one gramme of the former and five cc. of the 40 per cent. solution of the latter) has been discovered to yield a highly resistant end product on treatment with salicylic acid. The latter, in solution in a suitable organic solvent mixture (e. g. ethyl alcohol, butyl alcohol and ethyl lactate), is incorporated with the aqueous solution of the initial urea-formaldehyde compound and enters into reaction during the stoving operation. The compositions present features of interest as protective coatings for articles of non-ferrous metals, including brass and aluminum. Application may be by dipping or spraying, and the film is finally hardened by stoving for twenty minutes at 135° C., when the coating passes into the insoluble state. Successive coats can therefore be applied without danger of re-softening provided the stoving operation is carried sufficiently far. The process forms the subject of U. S. Patent No. 1,898,709. Even very thin hardened films of the composition are claimed to exhibit prolonged resistance to sulfur compounds, air, moisture, salt spray, alcohol, acetone and perspiration. It is to be noted that the salicylic acid does not act as a catalyst for the final resinification of the urea-formaldehyde compound, but actually participates in the reaction.

Fig. 1

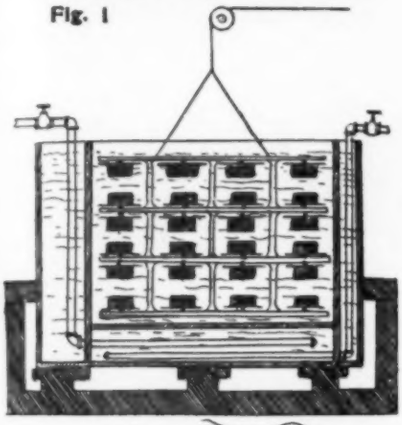


Fig. 2

Fig. 3

Lacquer Finishes on Straw, Felt and Fibre Hats

By George Rice*

While hat lacquering is not a new process in any hat factory or paint shop, but without the success which it has attained lately, many new artistic effects are being produced with high-boiling solvent lacquers.

DYED, stained, painted, embossed and parchmentized straw, felt and fibre hats for men and women are to have lacquered types added to their ranks, some of which will be plain white, others in two-tone effects or in multiple colors and design. It is the outcome of modernity in headgear coupled with certain style and service advantages obtained when a water-white, non-spotting, odorless and non-sticky lacquer is used on the hat surfaces at the right periods during the manufacture of the hat.

The glue sizings and the maize starch mixtures which have been used in the hat industry for stiffening, weighting and binding purposes have frequently been accompanied by a form of lacquer solvent, applied more or less loosely and inefficiently, resulting in spongy hat material and rather unsatisfactory work. If the poorly prepared sizing mixtures did not make the hat stock too soft and render it liable to premature loss of shape, it tended to stiffen and harden it, sometimes to the extent of laying the foundation for cracks to develop.

The sizings made from animal glues and vegetable starches possess good stabilizing properties in all kinds of hat stock. They also help the hat hold its shape better. However, they gradually weaken in normal service, and usually are entirely washed out when a hat is wet cleaned, dyed or renovated.

Nitrocellulose lacquer has better resisting powers and is seldom disturbed by any of the cleaning or coloring processes. It is not as readily solvent in any of the chemicals or dye liquids as the others.

The glue sizings commonly used in hat manufacture seldom have any effect upon the brightness or dullness of the finish of the hats. Their mission ends with the tautening of the fibre structure, aiding in retaining lines and dimensions when hats are roughly handled.

The adhesive nature of all lacquers makes them valuable strengthening bodies, and hats finished with them possess good bonding and adhering properties. The natural lustre of the lacquering material tends to develop the glow of the color of the hats, a feature appreciated in the millinery and hat trades in these times of rich colors and beauty of finish. Hat designers and experts assert that lacquered hats can be given novelty finishes better than glue-sized hats. Polishes in which a crystallizing theme is desired are more readily produced on the lacquered hats. Spatter creations, regulated so that the particles can be the sizes wanted, are easily done with a spray gun provided with the proper air-pressure control.

On some hat bodies, a coating of water stain is first applied. After this has dried, a filler is put on and the lacquer veiling accomplished. This acts as a sealer, which not only protects the color from fade, but makes it appear to be brighter than it really is.

Originally the use of lacquer in the hat trade was intended primarily as a substitute for the glue, flour, wax and farina sizing and weighing substances. Now it has been found to improve the looks of the hats.

Lacquer sizings are not used much outside of the straw hat industry but are being used on woven textile hats as well as on braided straws with equal success. They are used on felt hats for men and the snug fitting women's felts.

Lacquer as a Stiffener

Lacquer is a great stiffener of straw hat braid, and can accomplish the same purpose with any kind of silk, artificial silk, wool, mohair, felt or fibre hat. In the case of straw hats, the braid is plaited by hand or by machine and sized before it is made up into hats, unless for special reasons the sizing is applied after the hat is blocked. Sometimes the sizing is done both before and after. The technical structure of the braid is shown in Figure 1. There are hand-woven straw body hats which are very closely plaited. These require a thorough penetration of the

*Abstracted from *The Dyer & Calico Printer*.

sizing material, whether it be a glue size or a lacquer size, in order to make it fit close and lay smooth on the head.

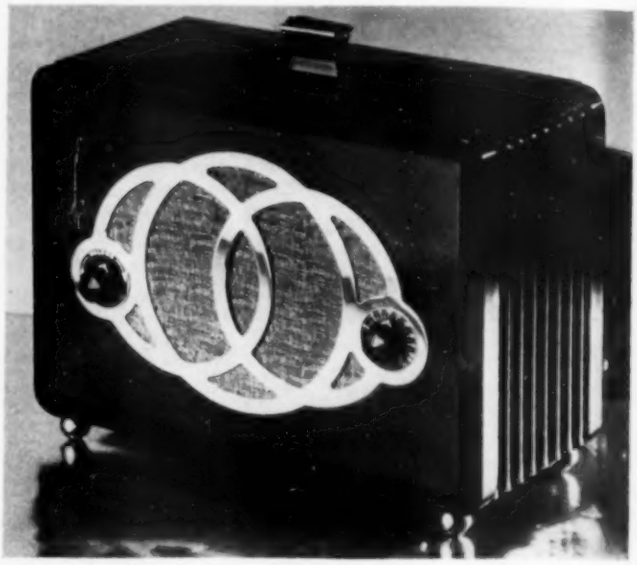
There being practically no ribbons, feathers or other trimmings on either straw or felt hats of the fair sex, the importance of the hat bodies being attractive is increased. The usual lighter and better appearance of the clear lacquer sizings is beneficial in this respect.

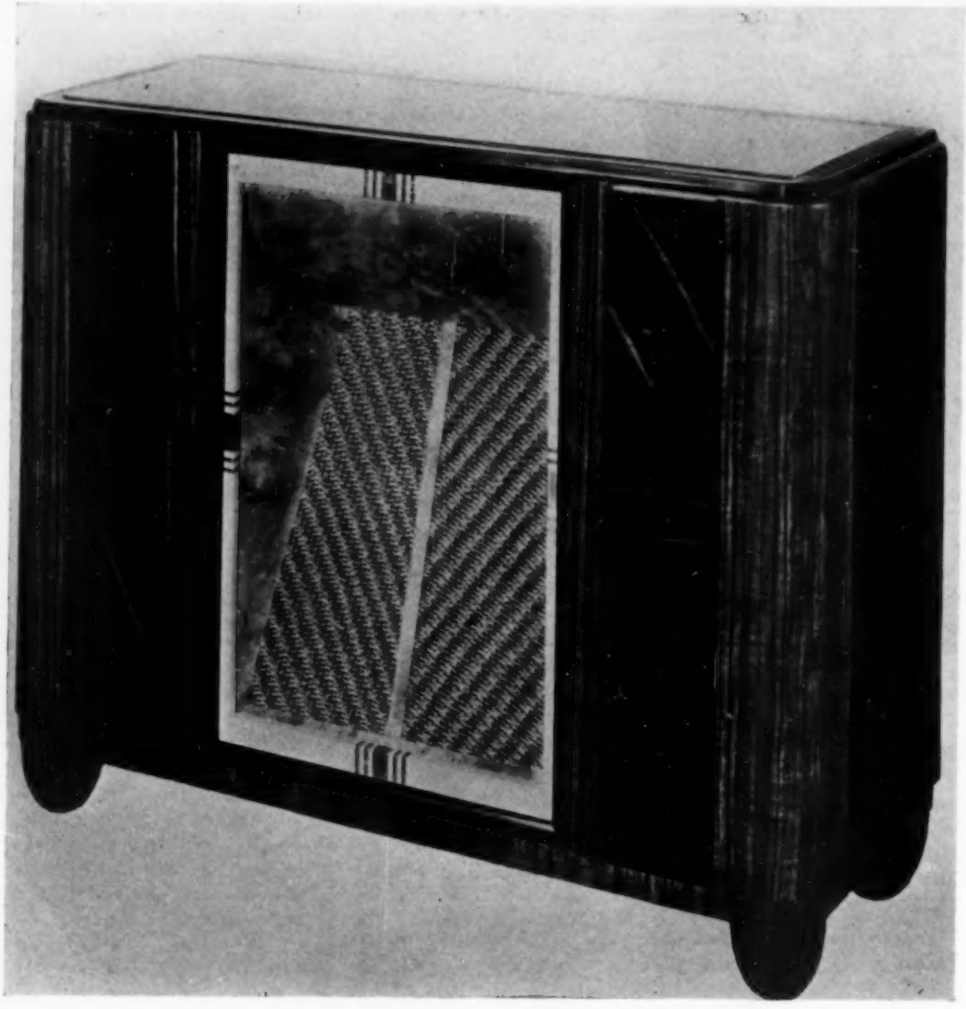
The hat stock in its loose state or when made up into hat bodies is put through a cleaning process which removes impurities and foreign substances in general and prepares the material for staining, dyeing or embellishing with the kind of finish or finishes required. The lacquer sizing reduced to an easy penetrating consistency is then applied by a hand or machine process, or as is the case under certain conditions, the sizing is applied before the coloring is done. A sectional view is given in Fig. 2 of a dipping tank, in which a frame is used for supporting a number of hats. The frame can be lowered into the sizing liquor by means of a rope and tackle. After the sizing has impregnated the fibre of the hat bodies, the frame is lifted and the hats are allowed to drain. When the dripping ceases, drying follows.

Lacquering with a Sponge

Some types of felt skull hats of women are lacquered with a sponge, as shown in Fig. 3. In the hand-sponging or brushing process only a veneering of the sizing is applied, which is wanted on some styles of felt hats, rather than a complete saturation.

Lumpy, mottled and uneven places can be avoided in the hand process by not using the sizing too stiff. Lacquered felt hats must be resistant to normal pressing and squeezing, but not boardy. Some samples we saw appeared to have a dry, powdery coating, as if an inferior grade of lacquer had been used in making the sizing, or as if it had been heavily plasticized. The failure of the lacquer films on hat materials is in most cases caused by the same reasons as similar failures on wood or metal. The increasing use of lacquer solvents in the hat manufacturing business provides a rich field for the consumption of not only the lacquers, but of certain varnishes, fillers, stains and enamels which hat manufacturers are experimenting with just now, because of their success with lacquer sizings.





Plastic Materials for Radios

In designing the midget radio shown above, Jan Streng, designer, originated some pleasing geometric lines and showed exceptionally clever handling of plastic material. The case molded by Norton Laboratories, is of black Durez, a General Plastics product, and has chromium trim, all of these features combining to make this new product an immediate best-seller.

The radio on the left may be seen in the United States Steel exhibit, at A Century of Progress, where it attracts large crowds because it is different in appearance and performance from any radio heretofore seen.

Aptly named, the Century of Progress radio was marketed by Philco, using special materials for the cabinets. The design is in the contemporary spirit, and in the building of this special instrument, The American Catalin Corporation furnished the ivory Catalin which frames the speaker and the instrument panel. The new Auditorium Speaker gives the radio a richness of tone and a volume of sound hitherto unapproached by any radio.

Analysis of Alpha-Cellulose

By W. M. Billing, Ph.D.

Chief Chemist, Virginia Cellulose Dept., Hercules Powder Co.

PROCEDURE. Approximately a 3.0 gram sample of air-dry material is placed in a weighing bottle, dried for two hours at 100°-105° C, cooled in a desiccator and weighed. The dried material is then transferred to a heavy tall 400 cc. beaker. The empty bottle and its cover are weighed and the weight of the sample obtained by difference. Thirty-five cc. of 17.5% NaOH solution (20° C.) (see note on preparation) are added, and the solution allowed to stand for five minutes. With a short glass rod, the end of which has been flattened to form a disc about 1 cm. in diameter, the pulp or cotton is macerated for ten minutes, adding intermittently in 10 cc. portions a total of 40 cc. of NaOH solution (20° C.) during the latter part of this interval (see notes). The beaker is covered with a watch glass. After thirty minutes additional mercerizing treatment in a water bath at 20° C. (total mercerization time, 45 minutes) 200 cc. of distilled water (20° C.) are added to the alkali-cellulose mixture, followed by a thorough stirring. The contents of the beaker are filtered immediately by means of suction on a 40 mm. diameter Jena fritted glass funnel, size 11G2. The residue in the funnel is washed with 750 cc. of distilled water (20° C.) by means of suction. The suction tube is disconnected, 40 cc. of 10% acetic acid (20° C.) are added and allowed to soak two minutes. Then the suction is applied to remove the acid. The alpha cellulose is washed with distilled water (20° C.) until free from acid. Litmus paper is used to test the filtrate (see notes). The alpha cellulose is carefully removed from the funnel to a tared, glass-stoppered weighing bottle, (the same one employed to weigh out the sample may be used). The alpha cellulose is opened and dried to constant weight at 100°-105° C. The initial drying period should be at least six hours. The weighing bottle and its contents are allowed to cool in a desiccator for at least thirty minutes, and then weighed. The alpha cellulose yield is calculated on the oven-dry weight of the material. The results are calculated as follows:

$$\frac{\text{Weight of Residue} \times 100}{\text{Weight of Dry Sample}} = \%\ \text{Alpha Cellulose}$$

Notes

(1) *The Preparation of NaOH Solution:* The NaOH solution is prepared by dissolving sticks, or pellets, of alkali in an equal weight of water, and allowing it to stand for two to three days for the sodium carbonate and impurities to settle out. The clear, supernatant liquid is decanted and diluted with CO_2—free water to approximately the required strength, and the alkalinity determined by titration with standard acid. The strength should be adjusted to 17.5+0.1 grams of NaOH per 100 grams of solution. It may be adjusted to sp. gr. 1.197 at 15° C. with a hydrometer instead of adjusting by titration with acid. Caustic of 18.0% strength used in the preparation of viscose has given the same results as 17.5% NaOH and can be used in its place in this determination.

To prevent the solvent action of the caustic solution on the glass bottle, the inside may be covered with a coating of paraffin. To accomplish this, dry the bottle thoroughly and pour in a quantity of melted paraffin heated to a temperature of 70-80° C. Rotate the bottle so as to get an even coating over the entire inside surface. Allow to cool before pouring in the 17.5% NaOH solution and keep in a cool place below 35° C. *Do not dilute the concentrated caustic solution in the paraffined bottle, as the heat of dilution may be sufficient to melt the paraffin.*

For convenience in drawing off the solution, the bottle may be fitted with a glass siphon. The end of the glass tubing inside the bottle should be bent in the shape of a small "U" so that in drawing off the solution, any sediment in the bottom may remain undisturbed.

Time Intervals for Steps in the Procedure

(2) Fifteen minutes should elapse between time of starting the alkali treatment of the individual duplicate samples. Such a procedure allows time before proceeding to the next sample in the duplicate determination for the various steps in the procedure, such as impregnation, maceration, filtration and partial washing.

If five minutes are allowed between the addition of a part of the alkali and the beginning of maceration, it will be found that sulfite pulp swells to five or six times its original volume and the fibres can be much more easily macerated. The remaining ten minute interval, during which the remaining 40 cc. of the alkali are added, making a total of 75 cc., has been found ample time for the maceration of the pulps.

(3) *Testing for Acidity:* To test for acidity of the wash water on litmus paper, the last few drops removed after the addition of water should be used.

(4) The method as given by the Alpha Cellulose Committee of the A. C. S. states that the air-dried material should be placed in a sealed container for a period of forty-eight hours to obtain a uniform moisture content throughout the sample. Separate portions of the conditioned sample are then taken for the moisture and alpha cellulose determinations. Experience has shown, however, that results equally as accurate may be obtained by making the alpha cellulose determination on the oven dried sample.

(5) The temperature must be controlled accurately in this determination, as at low temperatures the alpha cellulose is more soluble.

New Cellulosic Materials for Coatings Formulation

Some of the Desirable Characteristics of the Newer Ethyl Cellulose Compounds

New materials and improved technique in handling and compounding them promise some important advances in coatings formulation. In synthetic resins, in solvents, and in plasticizers, developments of this sort have come thick and fast; but even more fundamental have been the basic cellulose materials.

Nitrocellulose has been markedly improved as to quality and uniformity. The progress in solubility, in color, and in durability has been no less than startling. Similar progress has been made in cellulose acetate, although price and the lack of wholly satisfactory solvents for all purposes have been handicaps not yet wholly overcome, although recent developments have been more than encouraging.

Theoretically, cellulose itself has appealed to many coating experts as the ideal basic material. To date the solvent problem has not yet been satisfactorily solved. It would be a very brazen pessimist who could see no possibilities in the work being done with pure cellulose by continental investigators and the increasing supply, at lower prices, of purer and more uniform alpha-cellulose in this country must serve as a potent stimulator of American work along these lines.

Ethyl Ether Possibilities

Rumors that methyl ether cellulose and ethyl ether cellulose will soon be available commercially at reasonable prices from American sources of supply naturally arouses interest in these newer cellulosic raw materials. If these are put on our domestic market we can reasonably expect that the benzol ether cellulose cannot be far behind. Others of the ether-cellulose group have been made experimentally and the whole series subjected to exhaustive comparative tests abroad.

In a paper in a recent issue of the *Paint, Oil & Chemical Review* (July 13, 1933, pg. 9) some of the more important coating characteristics of the ethyl ether cellulose are dealt with rather specifically and in view of recent developments the following abstract is pertinent and timely.

This material is available in a pure white, granular powder easily soluble in toluol-ethyl alcohol mixtures as well as the other aeromatic hydrocarbon and alcohol mixtures, and in various ordinary nitrocellulose solvents. However, the high boilers are not ordinarily necessary inasmuch as ethyl cellulose films deposit out of even low boiling solvent solution for extraordinary resistance to blushing. When made into a pigmented enamel using rosin ester as the resin portion, using approximately the following solvent formula:

Seven pounds toluol
Three-quarters pound ethyl alcohol
One-quarter pound butyl alcohol plus two ounces xylol per gallon,

a very smooth brushing wall or architectural finish is produced.

One defect in nitrocellulose wall coatings has been the inability to get brushing qualities consistent with greatest ease of application and yet get complete freedom from curtaining or sags. If the material is made so that it sets up sufficiently fast to get freedom of these curtains the brush marks still show. It is possible, using ethyl cellulose as a base, to produce a perfectly free flowing architectural wall material with a requisite satin luster.

Favorable Advantages

Another factor which causes ethyl cellulose to be very desirable for this type of work is found when the solvent formula is noted. There is very little odor when material is being applied and this odor leaves in a short period of time. There is no residual odor such as often characterizes nitrocellulose under these conditions. Due to the more permanent qualities of elasticity and plasticity, smaller amounts of plasticizer are required than would be true of similar nitrocellulose formulation. Resins may be used which are not completely compatible with nitrocellulose without any special treatment. Such resins as ordinary kauri, pontianak or manila may be incorporated with ethyl cellulose in solution to form brilliant films when dry.

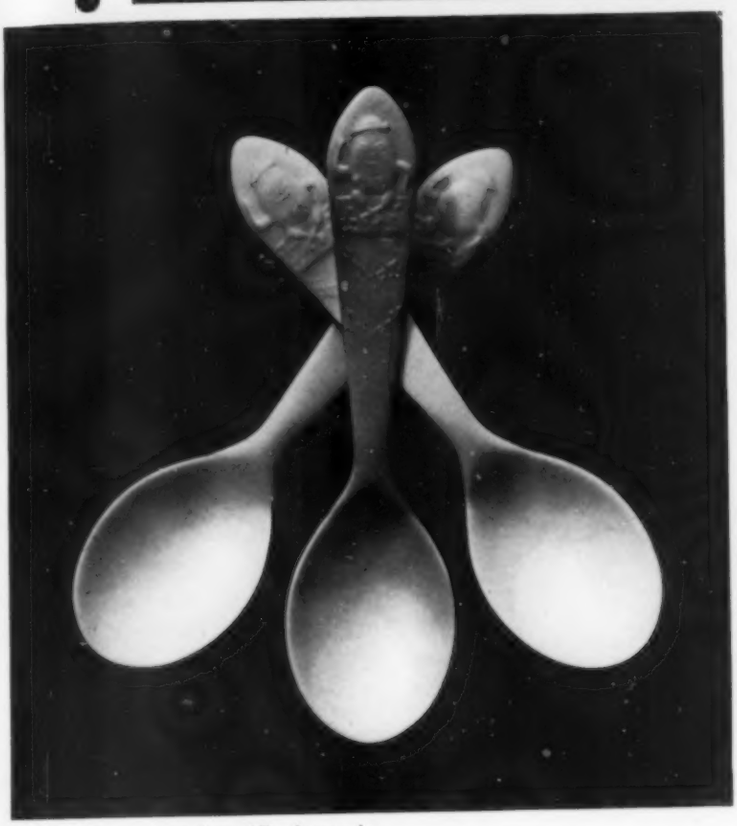
Many tests of durability of ethyl cellulose have been carried out. Upon light exposure, ethyl cellulose produces a film which gives much greater resistance to the actinic effect of light than does cellulose nitrate. Cellulose acetate is better than nitrate; however, the lack of plastic quality or flexibility causes it to break on outdoor exposure much sooner than a corresponding ethyl cellulose film. Due to the distinct elasticity of the film, ethyl cellulose finishes may be used on wood in many places where nitrocellulose films break down due to their inability to expand and contract with the base surface.

When these new ethers are available from domestic manufacturers, their excellent qualities, some of which are mentioned here, coupled with decrease in prices, will cause them to be very widely used.

A Synthetic Asbestos

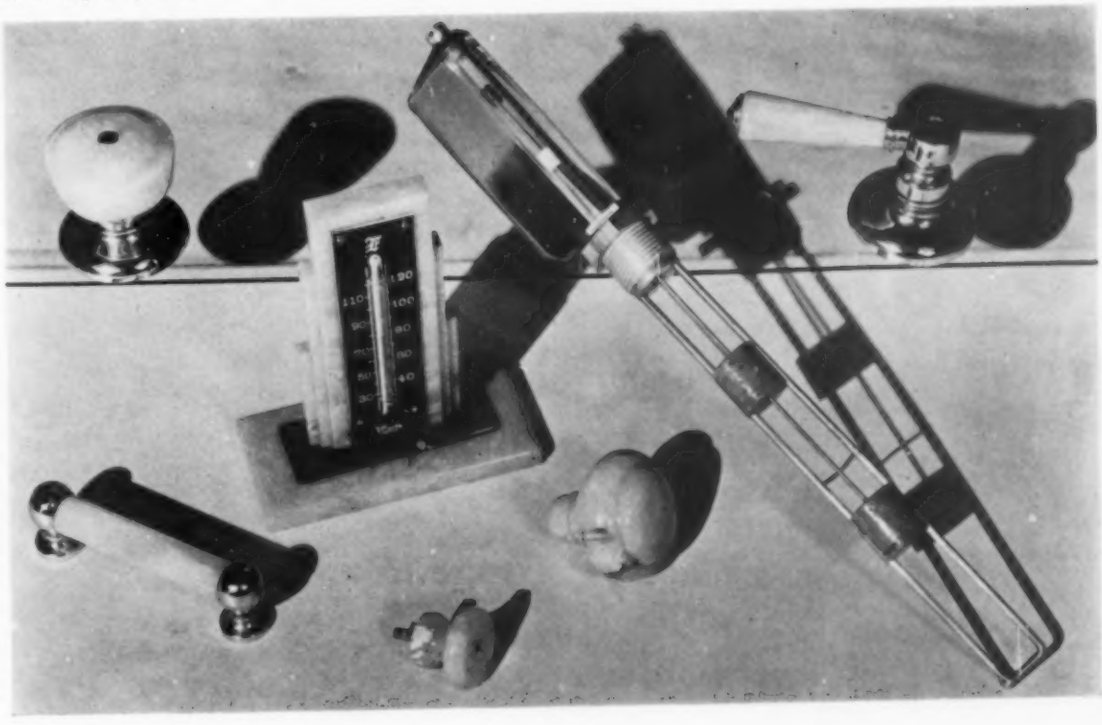
A new textile material, claimed to be a synthetic asbestos film, has been produced. Patents covering the process have been applied for by an American corporation, who intend to exploit this new material, which is said to have a silicate base and which can be produced in various forms as regards length of fibre, fineness, tensile strength and color. Its present form is a matted mass of fibre. Work is now being carried out to ascertain the insulating qualities of this material, the spinability of the various types of fibre, and comparisons between this synthetic material and natural asbestos are also being made in regard to the destruction of the fibres under heat.

Plastics in Pictures



Use of the gay new colors of Beetleware in molding these Humpty Dumpty spoons has added to otherwise familiar articles an extraordinary pulling power with consumers. Several million of these spoons were distributed by the manufacturers of Grape-Nuts Flakes in July, and were molded by Diemolding Corp. and Richardson Co.

The task of finding a suitable and durable encasement for the IRC Volt-ohmeter has been easily solved with the use of a Bakelite Molded case. This complete piece of test equipment covering voltage and resistance is small and light, and fits in any service kit.



Catalin invades the hardware field, emerging with hardware articles which, not only from the point of view of appearance but also that of utility, are improved 100 per cent. in appearance and value.

One would hesitate a few years back to offer a gift such as a manicure set, most likely because of the fact that it was cased in a cheap looking cardboard box. Today it is considered quite appropriate because sets such as Lady Lillian's can be had in almost complete plastic ensemble. This set is encased in a green and black Bakelite Molded box and the closures are of the same material. Developed by Northeastern Laboratories.

A combination paper and fabri ted bobbi excellent results in actual serv lf of the paper base gives smoothness, a rocessed a high degree of impact resistan ally troub duced for Merkel Bobbin Co. by p.

This handsome table, 18" in height and 22¼" in di ameter, was designed for a dual-use purpose. The lowe part can be removed and used as a serving tray. The tabl top and tray are both made of Bakelite Laminated in plaid design; the material is impervious to most liquid unaffected by heat, and can be washed easily.

A mischief-proof inkwell for school desk which cannot be removed, tipped, splashed tampered with, and which permits imm sion of the pen only to the proper point, h been developed of molded plastic materi The cover, incorporated in which is a l and the pen orifice, is molded of Gener Plastics' Durez. These will be fitted i the American Seating Co.'s desks this fall

r and fabric ated bobbin head which is giving actual servi alf of the head produced from a oothness, an rocessed from canvas duck adds act resistan ally trouble-proof bobbin. Pro- bbin Co. by p.

This is a rare use indeed for a laminated material which the Simmons Company has conspired in introducing this attractive metal bed, with inserts of Bakelite Laminated. The panels are unique in design and would seem to constitute a large order of laminated at one time.

The ash tray and electric lighter recently marketed by the Richardson Co. have been ingeniously designed to hold cigarettes, and the lighter operates on 110 volts, A.C. or D.C. circuits. Both are of Bakelite Molded and of exceptional appearance and design.

New Plastic Packages

Selected by the Editor of "Drug & Cosmetic Industry" as outstanding features in the packaging field

"Perstop", sister to "Perstick," is being introduced to the feminine world in a package combining at once both good looks and utility. A strong selling feature for this product is the new patented automatic plastic applicator allowing complete ease in application.

Merck & Company, with a view to capturing the eye of prospective customers in drug stores, enhance the dignity of their prescription chemicals by using plastic caps made of General Plastics material.

This handy little jar, designed for "Thinc" hand creme, is a compact package of blue and white plastic material and, when the cream has all been used, provides a handy container for sundry things.

A bottle of Yardley's fragrant perfume fitted into one of these attractive black plastic bases, and perched in a jaunty way on the counter, will not fail immediately to capture the eye of Milady as she does her shopping.

Synthetic Drying Oils

Their Manufacture from Acetylene

By L. Light*

In addition to its enormous importance in the welding industries, the exceptional chemical re-activity of acetylene renders it of peculiar significance as the raw material for a whole series of industrially important substances. Among these one may mention at random acetic acid and acetic anhydride. More recently, the attention of the paint trade has been attracted to the possibilities of converting it into synthetic drying oils presenting certain points of superiority over natural drying oils. Although the existence of compounds of this type was quite unknown until recently, the rapid headway which has been made in their development has almost, if not quite, brought them to the commercial stage.

Divinyl Acetylene

Interest has been mainly concentrated upon divinyl acetylene, $CH_2=CH-C\equiv C-CH=CH_2$, which is obtained by polymerization of acetylene in the presence of cuprous chloride and copper powder. In its essence this reaction is, of course, perfectly well known, having been used for the production of the synthetic resin known as cuprene, a name arising from the initial erroneous belief that the copper entered into combination. Under the special conditions outlined in English Patent No. 389,108 (du Pont de Nemours) a mixture of liquid polymers of acetylene is obtained, the most abundant of which is divinyl acetylene. By distillation under reduced pressure the latter can be readily isolated.

Divinyl acetylene is remarkable for the readiness with which it can be further polymerized to liquid non-volatile products which possess the general characteristics of drying oils. According to United States Patent No. 1,869,668 of the same firm, the liquid, isolated by distillation, is boiled at atmospheric pressure in the presence of air for four hours in a vessel provided with a condenser. At the end of that period the unchanged substance is distilled off under reduced pressure, leaving a viscous residue in a yield of 12—18% which can be described as polydivinyl acetylene. The latter possesses the general properties of a bodied drying oil and can be thinned to working viscosity with solvent naphtha.

Prevention of Gelling

Further research on the properties of divinyl acetylene has led to the discovery of interesting products obtained by hydrogenation under pressure followed by polymerization in the absence of air (English Patent No. 389,108). When heated under 2—10 atmospheres of hydrogen pressure at 70—100° C. with violent agitation, a fraction can be isolated by distillation at 70—80° C. which contains hexatriene—1, 3, 5. This extraordinary substance can be stored for an indefinite period at room temperature if kept in an atmosphere of nitrogen, but exposure to air leads to rapid polymerization and oxidation, with consequent gelling at room temperature in several days. Under suitable conditions it is, therefore, obvious that coating compositions of remarkable speed of drying can be obtained. The problem presents itself, however, of so standardizing the process that the oil is despatched to customers in a suitable degree of polymerization. Then there is the additional problem of preventing gelling in the containers after despatch and during use. Very much the same difficulty arises when using the rapid-drying synthetic resin-chinawood oil varnishes. The skinning and gelling of the new products in the container can likewise be appreciably reduced by incorporating an anti-oxidant such as eugenol.

The polymerization of hydrogenated divinyl acetylene is preferably carried out at a temperature of 120—150° C. in the presence of a catalyst, such as potassium percarbonate, barium peroxide or benzoyl peroxide. The synthetic drying oils dry and harden in thin films on exposure to air at ordinary or elevated temperature, and the rate of drying can be increased by incorporating metallic driers.

Reaction with Chlorine and Sulfur

The unsaturated character and polymerizable nature of divinyl acetylene can be further exploited by reaction with chlorine and sulfur. According to English Patent No. 389,122, for example, the rubber-like polymer produced on boiling divinyl acetylene for five hours at 85° C. in the absence of air forms a viscous solution in acetone after treatment with 1% sulfur chloride. The reaction with the latter substance leads to the entry of both sulfur and chlorine into the molecule of divinyl acetylene, causing remarkable improvement in coating qualities. One test which vividly illustrates this last point consists in directly applying a coat of the solution to pickled steel followed by two coats of the synthetic acetylene drying oil, which had not been treated with sulfur chloride. After seven days' exposure to moist hydrochloric acid the system was perfectly intact. By contrast, a coating on the same metal consisting of untreated synthetic drying oil alone was rapidly destroyed under the same conditions. In another test a sand-blasted iron pot was given a direct coating of the sulfur chloride-divinyl acetylene oil, followed by two coatings of the untreated oil. It was then subjected to alternate heating (to 120° C.) and cooling, when the coating scheme afforded excellent protection. The same coating also withstood four months' exposure after application to a cement floor exposed to shock, chemicals and abrasives, whereas a coating of the untreated synthetic drying oil stripped off after one month.

*Abstracted from *Synthetic and Applied Finishes.*

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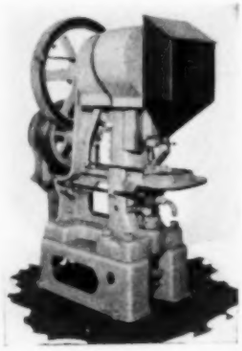

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RESIN DYES

Aliphatic Derivatives in the Plastic Industries

THE demand for new and better solvents available in commercial quantities and at economic prices has increased enormously and has not remained unsatisfied. This development began with the use of cellulose dopes for aeroplane wings, followed some years later by the use of cellulose lacquers for automobile bodies, as the result of a search for a finish which would be cheaper and at the same time more durable than the old coach-builders' paints and varnishes which required innumerable coats and an immense amount of hand-work in rubbing down between the coats. More recently the application of these lacquers to house decoration and furniture has opened up another new and almost unlimited field, and one which may herald a complete revolution in the paint and varnish industry Finally the extraordinary development during the last few years of articles of all kinds molded from plastic materials such as synthetic resins has led, and is still leading, to a greatly increased demand for special solvents.

Among the different groups of solvents, the terpenes, the paraffins, aromatic coal-tar products, chlorinated compounds, and so on, the aliphatic alcohols and their derivatives, now stand out as the most important group. In a recent work on solvents, more examples of this group are dealt with than of all the others put together, and some idea of the wide range of these products which are now available and the diversity of purposes for which they are used is given below.

Oils, Fats, and Waxes: Ethyl acetate, acetone, butyl alcohol, butyl acetate, butyl formate, amyl formate, amyl acetate, iso-butyl acetate.

Cellulose Acetate and Nitrate: Ethyl formate, ethyl lactate, acetone, diacetone alcohol, butyl lactate, iso-butyl lactate, amyl acetate, amyl lactate.

Lacquers and Dopes: Acetone, diacetone alcohol, ethyl acetate, butyl lactate, butyl acetate, dibutyl phthalate, iso-butyl lactate, amyl acetate, amyl lactate, diamyl phthalate.

Resins, Natural and Synthetic: Acetone, diacetone alcohol, acetaldehyde, ethyl acetate, butyl alcohol, butyl acetate, butyl formate, butyl propionate, butyl lactate, iso-butyl alcohol, iso-butyl acetate, amyl lactate.

Shellac and Gums: Butyl alcohol, butyl acetate, butyl lactate, iso-butyl alcohol, amyl alcohol, iso-butyl acetate, iso-butyl lactate, diacetone alcohol, ethyl acetate, ethyl lactate, methyl acetate, iso-propyl acetate, iso-propyl lactate.

Plasticizers: Amyl oleate, diamyl phthalate, amyl stearate, diamyl tartrate, butyl oleate, dibutyl phthalate, butyl stearate, dibutyl tartrate, ethyl oleate, diethyl phthalate, diethyl tartrate.

Essences and Confectionery: Amyl acetate, amyl formate, butyl propionate, iso-butyl acetate, ethyl acetate, ethyl formate, iso-propyl acetate, propyl acetate.

Perfumes: Amyl formate, butyl propionate, dibutyl phthalate, butyl salicylate, iso-butyl alcohol, iso-butyl acetate, triethyl citrate, diethyl phthalate, ethyl salicylate, iso-propyl acetate, propyl acetate.

Soaps and Polishes: Amyl stearate, dibutyl tartrate.

Paint Removers: Acetone, mesityl oxide.

Rubber Accelerators: Acetaldehyde, butylaldehyde.

Some of these solvents derived from alcohol are now being manufactured in this country at the rate of thousands of tons per year, while the demand for others is growing very rapidly. The derivatives of amyl, propyl, and iso-butyl alcohols, are at present dependent for their raw materials upon the supply of fusel oil, a by-product of the manufacture of ethyl alcohol, while others, such as methyl ethyl ketone and mesityl oxide, are by-products of acetone manufacture. The available quantities of these by-products are limited, and if the demand for the corresponding solvents continues to increase, and it would undoubtedly increase if more abundant supplies were available, it may become necessary to work out new processes for making them, starting from other and more plentiful raw materials.

"Softened Rubber"

A new plastic form of rubber said to facilitate processing operations and effect large economies called "Softened Rubber," for which many novel claims are made, has attracted a great deal of attention in England, where a plant for producing this rubber has just been opened. The following is a summary of the patent:

A soft rubber is produced by exposing crude rubber in dry condition and without mechanical working to an oxidizing atmosphere at a sufficiently elevated temperature, e.g., 330-347°F., for a sufficient time to produce an increase of weight of at least .5 per cent. and preferably of about 2 per cent. Preferably the rubber is first heated under non-oxidizing conditions, e.g., under reduced pressure, then under oxidizing conditions which are continued while the rubber cools. The rubber is preferably in crumb or sheet form to present an extended surface to the oxidizing gases. In an example, rubber as received from the plantation is reduced to crumb, charged on to trays, and heated *in vacuo* to 340-345° F. for two hours; air is then admitted and the heating continued for about 45 minutes; the trays are then removed from the oven, piled in such a manner as to allow free circulation of air, and allowed to cool for about 45 minutes to about 120° F.; the crumb is then homogenized by masticating for 3 to 5 minutes.

The practical operation of the process is as follows: It consists of a treatment by which the rubber is first of all reduced to crumb; this crumb is then taken and placed in trays in a huge vacuum heater—capable of treating 1,000 lb. in one charge—where it is given a heating in vacuum, lasting about one hour, followed by forty minutes in controlled conditions. When the doors of this oven are thrown open the crumb rubber is seen to have been converted to something (in appearance) very like toasted cheese. It next goes to the agglomerator—a pair of rolls which compact it again into sheet form.

The "crumber," consisting of a pair of rolls working in a hopper, takes the chunks of baked crepe from the soaking tanks in which they have been put to soften, and grinds or chews them into crumb. Below the rolls is a "saddle," on to which the rubber is forced—that is, the rubber goes down the nip and comes up on either side of the pair of rolls.

Softened rubber is ordinary plantation crepe or sheet which is converted into a form which is more plastic than ordinary masticated rubber, which behaves normally during vulcanization and yields products after vulcanization which, having regard to manufacturing conditions, are substantially of the same quality as those made with ordinary masticated rubber. As a result masticating, mixing, calendering and tubing operations are greatly facilitated, and far less power is required in the factory.

Claims made for softened rubber follow are that it saves power, time, labor, solvents, overhead, increases plant output and efficiency. Its use does not affect vulcanization, hardness, tensile strength, resistance to abrasion. It increases resistance to tear and absorption of water and air. It is also claimed that the possibility of scorching is greatly reduced.

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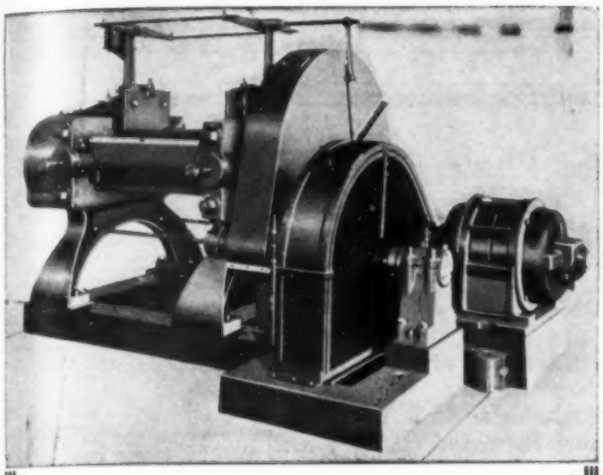

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Plastics in the News

Lacquer Association Started—Divisions of the Plastics Industry Meet Under Blue Eagle—Zapon-Brevolite Lacquer Formed—Bakelite's Swan Denies Resignation Rumors—Westinghouse Announces Micarta No. 1C17.

Lacquer Manufacturers' Association, in the process of formation for several months, came into being Aug. 17 at a meeting at the Chemists' Club (N. Y.)

After preliminary remarks by Frank G. Breyer, who at the request of several of the lacquer companies, performed the necessary preliminary organization work, the following officers were elected to serve until the next meeting of the association to be held Oct. 1. G. J. Nickolas, G. J. Nickolas & Co., Chicago, is president; A. N. Brown, Agate Lacquer, Long Island City, is vice-president; R. V. Kirk, Roxalin Flexible Lacquer, Long Island City, is treasurer, and J. P. Hubbell (associated with the Singmaster & Breyer) is secretary. Directors elected were M. J. Creighton, of Zapon Co., Stamford; O. J. S. de Brun, Egyptian Lacquer Mfg. Co., Kearney, N. J.; F. S. Magnus, Maas & Waldstein, Newark; B. Leister, Duralac Chemical, Newark; I. Flamenhaft, Lacquer and Chemical Corp., Brooklyn, and Gilbert Spruance, Gilbert Spruance Co., Philadelphia. Those attending: William C. Freimuth, of G. J. Nickolas & Co., Chicago; John A. Ronan, T. J. Ronan, Inc., N. Y. City; A. N. Brown and W. W. Chece, of Agate Lacquer Co., Long Island City; Frank Breyer and J. P. Hubbell, of Singmaster & Breyer; R. V. Kirk, of Roxalin Flexible Lacquer, Long Island City; O. J. S. de Brun, of Egyptian Lacquer Mfg. Co., Kearney, N. J.; M. S. Magnus, of the Maas & Waldstein Co., Newark; I. Flamenhaft, of Lacquer & Chemical Corp., Brooklyn; Gilbert Spruance, of Gilbert Spruance Co., Philadelphia; J. F. Rudd, of the J. W. Masury Co., Brooklyn; G. H. Altbach and L. Kane of United Lacquer Mfg. Co., North Arlington, N. J.; E. H. Hansom of Zapon Co., Stamford, Conn.; B. Leister, of Duralac Chemical Co., Newark, N. J.; H. G. Lapidus, of Atlantic Lacquer Co., Belleville, N. J.; and C. R. Bragdon, of Ault & Wilborg Corp., N. Y. City.

At the meeting question of a code for lacquer was discussed. It was the consensus of opinion that the Association should confine its efforts for the time being to endorsing and supporting representative lacquer men in the election of lacquer representatives on the Committee of 48, which is to administer the paint, varnish and lacquer industry code. It was pointed out that a major function of the Association during the coming year will be to give support to the lacquer group on this Committee in their efforts to promote and protect interests and to improve conditions in the lacquer industry.

The following resolution was moved, seconded and unanimously carried:

RESOLVED that this Association endorses O. J. S. de Brun and R. Neuberger as lacquer representatives for the Eastern Section, R. W. Levenhagen and W. C. Dabney as lacquer representatives for the Central States and Andrew Brown as lacquer representative for the Pacific Coast on the Committee of 48, which is to administer the paint code.

Raw Materials—Blue Eagle

Plastics Manufacturers' Association was formed Aug. 8 at a meeting attended by representatives of an overwhelming majority of those companies engaged in the field. Manufacturers of cellulose plastics, phenolic resins, urea resins and casein are eligible for membership.

The Plastics Manufacturers' Association will be a sub-division of the Chemical Alliance and the members of the association will sign the blanket code of the Alliance.* Officers elected: president, A. E. Pitcher, du Pont Viscoloid Co., 350 5 ave., N. Y. City; L. M. Rossi, Bakelite; W. P. Pickhardt, Unyte Corp.; and John E. Walker, secretary, 1001 15 st., Wash. D.C.

*Public hearing of the Chemical Alliance Code is scheduled for Sept. 14.

Fabricators

Fabricators of cellulose plastics, phenolic resins, urea resins and casein have also effected an organization—the Plastics Fabricators' Association—with the following officers: president, H. I. Hill, Celluloid Corp., 10 E. 40 st., N. Y. City; vice-president, Harry Levine, New England Novelty, 39 Spruce st., Leominister, Mass.; treasurer, A. Goodman, H. Goodman & Sons; and secretary, John E. Walker.

The Plastics Fabricators' Association has approved a code for submission to the NRA and the code will be filed as soon as the necessary statistical information can be secured in order to file the necessary application along with the code. Membership of the Association at present is largely composed of manufacturers of toilet ware, combs, hair ornaments, novelties, dice and umbrellas.

Plastics industry is no longer the "baby of the Chemical Exposition. A beer brewing section will be added for the next exposition scheduled for week of Dec. 4, 1933 at the Grand Central Palace, N. Y. City.

June Coating (Lacquers, Varnish, Paint) Sales*

Sales of paint, varnish and lacquer products in June totaled $27,803,750 in value, according to a preliminary report by U. S. Bureau of Census from data supplied by 588 establishments. June, 1933, sales were the best in any month in the last two years. June sales compared with $26,229,638 in May and $19,637,358 in June last year.

	Total sales reported by 586 establishments	*Classified sales reported by 344 establishments* — *Industrial sales* — *Total*	*Paint and varnish*	*Lacquer*	*Trade sales of paint varnish and lacquer*	*Unclassified sales reported by 242 establishments*
1933—*January	$11,275,396	$3,529,886	$2,386,947	$1,142,839	$4,168,260	$3,577,250
*February	11,665,734	3,423,033	2,445,378	977,655	4,771,706	3,470,995
*March	13,578,568	3,391,947	2,484,550	907,397	5,788,213	4,398,408
*April	19,043,787	4,677,309	3,143,803	1,533,506	8,582,411	5,784,067
*May	26,229,638	5,990,295	4,296,812	1,693,483	11,780,920	8,458,423
†June	27,803,750	6,826,268	4,831,310	1,994,958	12,443,411	8,534,071
1932—January	$15,894,506					
February	16,270,822					
March	19,089,005					
April	22,612,193					
May	24,981,441					
June	19,637,358	$4,685,399	$3,617,719	$1,067,680	$8,734,330	$6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
*November	12,492,818	3,599,319	2,639,362	959,957	5,196,766	3,696,733
*December	9,484,520	3,222,770	2,186,706	1,036,064	3,506,715	2,755,035
Tot., year	$203,323,315					
1931—June	28,587,155					
Total (year)	$278,442,170					

Comparable statistics not available.

*Revised. †Preliminary.

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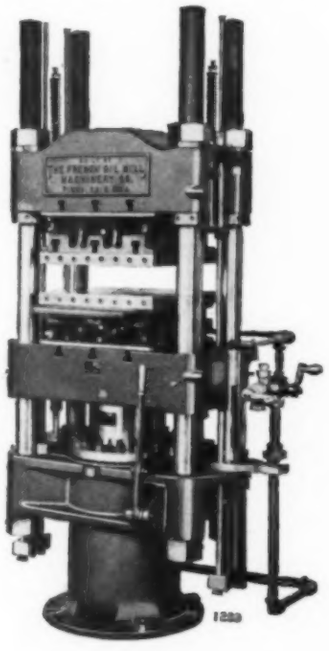

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California Lacquer

Southern California Paint, Varnish and Lacquer Association was formed last month with J. R. Davis (Atwater Paint, Long Beach) as president and temporary secretary-treasurer, and O. B. Pennington (India Paint & Lacquer, Long Beach) as vice-president. Organization is cooperating with Los Angeles Paint, Oil and Varnish Club. Membership also includes:

H. F. George, Wm. D. George Paint & Varnish Co.; W. E. McGrew, McGrew Paint Mfg.; S. C. Spellens, National Paint & Varnish; E. C. Bishop, Premier Oil & Lead Wks.; H. T. Holtslander, Superior Paint & Lacquer Wks.; Wm. Heyser, Southwest Paint; F. C. Marzo, F. C. Marzo Co.; H. W. Derry, Globe Paint Co.; C. E. Westerfield, Tibbetts-Westerfield Paint; E. B. Hulett, Peck's Pure Paints; Wm. Isenberg, Isenberg Paint & Color, Ltd.; W. H. Handley, Surety Paint; Herman Spiegelman, Consolidated Paint; A. J. DeGregory, DeGregory Paint; F. J. Boehme, Hughes Paint; D. I. Wornow, Wornow Progress Paint; L. H. Freedman, Dry Color Paint; George E. Davis, Smith-Davis Paint, Culver City; E. S. Slemons, Ellis-Slemons Paint, Long Beach; Wm. A. Wood, Black Duck Products, Inc., Whittier; Chas. Benton, Benton Roof & Paint, San Diego; J. S. Ellis, Ellis Paint, Long Beach.

Zapon-Brevolite

A new corporation, to be known as Zapon-Brevolite Lacquer, has been formed to handle consolidated business of Brevolite Lacquer Co. of North Chicago, and western activities of Zapon Co., a subsidiary of Atlas Powder. Combination became effective Sept. 1. Although for the present Chicago branch of the Zapon Co. will continue its present location, it is planned to centralize activities of new company as soon as possible in the Brevolite factory and sales office, North Chicago. No change is contemplated in personnel of either organization following consolidation.

United Lacquer Manufacturing, North Arlington, N. J., which has been in business for 10 years, has leased a large factory building at Elizabeth ave., and Stiles st. Linden, N. J., for manufacture of industrial lacquer enamels. The old plant in North Arlington had grown inadequate for its rapidly expanding business.

Prudential Lacquer & Chemical has moved plant to 38 9 st., Long Island City.

New Resin Producer

Varcum Chemical, Niagara Falls, N. Y., is now producing synthetic resins for the paint, varnish and related industries. Company began operations in January and is specializing in pure phenolics. G. E. Lewis is president and Wilfred Parker is in charge of production.

Lacquer Health Hazards

British inquiry into effects on health of exposure to cellulose lacquers has continued according to the *Chemical Trade Journal* (British). Clinical and haematological examinations have proved negative in so far as demonstrating definite illness; nevertheless, they do emphasize that vigilance in maintaining a good standard of ventilation and a reasonable temperature (this latter particularly in aeroplane works) is required. It is interesting to note that an inquiry in France into cellulose spraying found no evidence of ill-health attributable to the work where good conditions existed.

Lacquer exports from Germany in first half of this year amounted to 3,225 metric tons, compared with 3,187 tons in corresponding period in 1932.

Pittsburgh Plate Personnel

Pittsburgh Plate Glass is enlarging paint research operations under direction of Research Director P. R. Croll, Milwaukee. S. N. Rhue has been named director of technical sales research and will continue his duties in Milwaukee. He will also supervise trade sales development. O. J. Hartwick has been transferred to Milwaukee from Newark as specialist in industrial lacquers. W. A. McKim has been added to Newark staff, as well as H. W. Letts. H. S. Nanejian was appointed to take charge of Newark lacquer research. Dr. W. W. Bauer has been named chief of basic research in all products of the paint and varnish division, while C. P. Holdt recently joined the staff in Milwaukee as a specialist in the field of synthetic coatings.

Other Changes

William H. Robinson, formerly associated with engineering dept., Spray Engineering, is now with New England sales force of Roxalin Flexible Lacquer, Long Island City, N. Y. Maas & Waldstein, Newark, N. J., has appointed C. L. Berry western sales manager with Chicago headquarters. He has been with the company for a number of years. Glenn A. Gordon, for several years connected with Beckwith Chandler's Detroit offices, is now at the Newark factory in charge of experimental and service depts. E. J. Peters is now purchasing agent for Pittsburgh Plate Glass' paint and varnish division, succeeding late Floyd E. Francis.

Paint Code

Ernest T. Trigg's paint code committee mailed late in August ballots to all known paint, varnish and lacquer companies requesting votes on commodity group representatives in accordance with Article IX of the code which has been filed with NRA in Washington. These were returnable Sept. 2 to the American Paint & Varnish Association, Washington. Election of the 48 board members by communities will follow.

Cellulose

Canadian Industries, Ltd., announce work has begun on extensions to C-I-L factory where Cellophane is manufactured in Canada under contract with Du Pont Cellophane. Excavating has started for an addition to the moisture-proof building and some new equipment is being installed in the recently completed extension to the chemical building.

Cellulose Plastic Products
June, 1933
Compared with preceding months

Bureau of the Census presents, in following table, monthly statistics on production and shipments of cellulose plastic products (sheets, rods, and tubes), based on data furnished by eight identical establishments. Comparable statistics, prior to January, 1933, segregated for nitro-cellulose and cellulose-acetate products, are not available. This report takes the place of the monthly report on "Pyroxylin Sheets, Rods, and Tubes."

Production and Shipments in Pounds

	Nitrocellulose						*Cellulose Acetate*	
	Sheets		*Rods*		*Tubes*		*Sheets, Rods, and Tubes*	
Year and month	*Production*	*Shipments*	*Production*	*Shipments*	*Production*	*Shipments*	*Production*	*Shipments*
1933								
January	504,813	625,392	74,872	115,434	12,812	29,329	167,856	160,272
February	490,290	593,942	78,904	100,092	16,248	25,711	141,628	125,073
March	454,506	611,840	63,188	87,784	17,472	32,525	119,400	117,344
April	473,333	624,727	104,817	130,853	26,198	27,091	149,402	211,435
May	787,614	774,424	161,784	126,195	32,684	36,992	234,811	221,345
June	912,742	976,258	156,830	139,772	41,467	45,057	248,949	235,875

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Hygrade Sylvania Corp. has declared regular quarterly dividends of 50 cents on the common and $1.62½ on the $6.50 convertible preferred, both payable Oct. 2 to stock of record Sept. 9.

Safety Film Reduced

Eastman Kodak, as a contribution to the campaign for safety in hospitals, has eliminated a previous premium in price of safety film, and is making available safety X-ray film made of cellulose acetate stock at the same price as the ordinary nitrate stock film.

Another Explosion

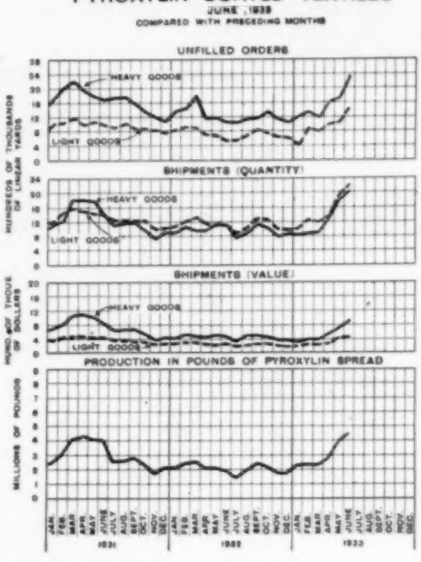
Explosion in a machine room of Celluloid Corp., Newark, N. J., on Aug. 22, resulted in death of three and injuries to score of others. Explosion occurred in an exhaust duct which was supposed to carry waste particles of cellulose dust from room.

Celluloid Safety Literature

International Labor Office (League of Nations) has just published "Safety in the Manufacture and Use of Celluloid"—a most valuable contribution to the safety literature in view of the several serious catastrophes of the past few months in this field. Everyone engaged in the celluloid industry should read this publication. Copies are available at $1 from World Peace Foundation, 40 Mt. Vernon st., Boston, Mass.

June Production

Following table presents monthly statistics relating to pyroxylin-coated textiles based on data reported to Bureau of the Census by 19 (a) identical establishments comprising most of the industry. Data given include products manufactured by spreading nitrocellulose or pyroxylin preparations, either by themselves or in combination with other materials, upon grey goods, such as sheetings, drills, ducks, sateens, moleskins, etc. The monthly capacity of the 19 establishments, amounting to 11,400,064 yards, in June, is based on a maximum quantity of



1.27 to 1.30 sateen, coated to a finished weight of 17½ ounces per linear yard, in a 24-hour working day, 26 days to a month.

Rockland & Rockport Lime, Rockland, Me., is marketing lime in cellophane lined bags which protect against moisture for one year.

Dr. Irving Weber, for 9 years in charge of Fiberloid Corp.'s research and technical service dept., has resigned.

H. B. Vollrath, for 14 years a Baker Perkins sales engineer, is at Fredericksburg, Va., plant of Sylvania Industrial.

Revolite Corp., New Brunswick, N. J. is about to place a new waterproof tape for general and household use on the market. It is to be called Utilitape.

"Triplex Toughneed" is a new safety glass marketed by Triplex Safety Glass, England.

	1931 June	1932 June	1933 May	1933 June
LIGHT GOODS:				
Shipments				
Linear yards	1,413,304	1,143,830	1,954,056	2,015,903
Value	$417,340	$261,587	$423,945	$445,925
Unfilled orders (b)				
Linear yards	987,091	530,717	1,056,185	1,422,797
HEAVY GOODS:				
Shipments				
Linear yards	1,401,247	1,091,795	1,805,899	2,186,005
Value	$811,718	$477,324	$729,473	$923,785
Unfilled orders (b)				
Linear yards	1,668,825	1,047,658	1,697,242	2,322,645
PYROXYLIN SPREAD (c):				
Pounds	4,000,794	1,943,932	3,919,677	4,449,992

(a) Of the 19 establishments reporting for June, 1933, 3 establishments did not report prior to January, 1933.

(b) Orders on hand at the close of the current month (reported in yards only) exclusive of contracts with shipping dates unspecified.

(c) Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly.

Molded

Molders met at NEMA headquarters, 155 W. 44 st., N. Y. City on Aug. 11 to consider further the questions of permanent organization and a code, and to elect officers. George Scribner, Boonton Molding, was elected president, D. S. Kendall, Mack Molding, vice-president, and G. B. Neal, Norton Laboratories, secretary. Prescott Huidekoper was elected treasurer.

J. P. Case, American Record, chairman of a committee of three (others being George Scribner and Frank A. Shaw) to select a permanent secretary, reported that three candidates were under consideration but the committee was still unprepared to make a definite recommendation.

A lengthy discussion was held on the question of remaining under the NEMA fold. Matter of financing was thoroughly gone into and the concensus of opinion was in favor of NEMA, largely because it appeared from figures submitted that organization could be effected at a lower cost per member. On a motion bringing the question to a vote two voted for a general code, one was undecided and 24 voted in favor of permanent affiliation with NEMA.

A September meeting of the group will be held, the date to be selected later by President Scribner.

G. E. Adopts Blue Eagle

NEMA code, in accordance with the President's approval, went into effect Aug. 15. Gerard Swope, G. E. president after a meeting of the company executives at Bridgeport, Conn., Aug. 14, said that the company had anticipated the acceptance date by one week, and that as far as hours and wages were concerned all changes were effective as of Aug. 7. No one under 16 years of age has been employed so there is no necessity to make any eliminations, Mr. Swope said. Hours have been decreased in accordance with the code to 36 hours a week in the shops and 40 hours a week in the offices. The 40-hour week in the offices has been in effect since April, 1931. All wages and salaries have been increased where necessary to reach the minimum, and equitable adjustments in other salaries have been made.

The total amount of such increases is at the rate of $8,000,000 per year, affecting more than 42,000 employes, including almost 2,000 additional employes immediately put to work, Mr. Swope said.

Harry Davies Co., (Daka-Ware products) 1428 N. Wells st., Chicago, has taken over the entire plant formerly occupied by Real Equity Shop.

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Swan Denies Rumors

Hylton Swan, Bakelite, returning from a 2-months European trip emphatically denied rumors that he had resigned from Bakelite or had any intention of doing so.

Quite to the contrary Mr. Swan reported that as a result of information gained while he was abroad the company would shortly undertake the development of a revolutionary use for Bakelite in the printing industry. For the present Mr. Swan will give all of his attention to this work. In the meantime, his assistant, Gordon Brown, will direct the activities of the Bakelite sales dept.

Said Mr. Swan when interviewed: "In fairness to myself and the Bakelite Corp. I wish to make it clear that the new work I have taken on is of my own volition; and in no sense has there been a severance of my services or associations with Bakelite, or my directorship in the Corporation."

G. E.'s N. Y. City plastics dept. is now located at 570 Lexington ave. (new G. E. Bldg.).

New "Resinox 600"

"Resinox 600" (Resinox Corp., Commercial Solvents and Corn Products' subsidiary) is said to be proof against fading in the light pastel shades. For this reason it is greatly in demand. Specifications are available from the company.

R. C. Shuey of Bakelite's technical sales staff has been on the Pacific Coast.

Plastics Abroad

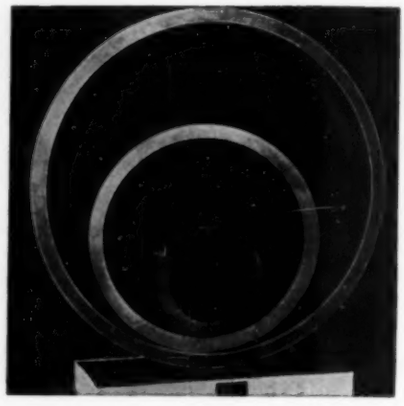
I. C. I. (Imperial Chemical Industries) is reported as having acquired an interest in Croydon Mouldrite, Ltd. T. R. Mackenzie, Birmingham representative of Messrs. Tullis, Russell & Co., (manufacturers of absorbent papers used in the plastic trade) was the *British Plastics* (English publication) golf trophy winner. Decline in exports of German plastic materials still continues, although in a lesser degree than in 1932. Most important foreign markets for German plastic products are the European industrial countries and overseas, British India and the Argentine. For the last six months a considerable increase in the output of German plastics plants has been noticeable. British Cyanides Ltd., which has specialized with the urea type of resin, hopes to expand its range to include others, such as the phenolformaldehyde type. I. C. I. now produce the widest range of all, including phenolformaldehyde, glyptal and benzyl cellulose.

According to "Elektrotechnische Zeitschrift," a new molding composition developed by H. Rommler A.G. combines impact-resistance strength exceeding that of cast iron with high insulating value and complete resistance to moisture, salt spray, ammonia, and acid fumes. Composition consists of synthetic resin and linen in the form of shreds, and it is claimed that, unlike the "hard linen" compounds hitherto available, new material can be pressed into complicated shapes.

Bakelite has completed a pamphlet "The Versatile Service of Bakelite," giving briefly origin, manufacture and industrial applications of many types of Bakelite products created from the initial resinoid.

Laminated

New grade of Micarta, known as grade No. 1C17, has been developed by Westinghouse Electric for radial part of roll neck bearing on severe applications.



Grade 863, which is similar in texture, is being used for thrust plates on all bearings. It can be machined or sawed to any desired shape. Advantages of this grade for radial liners, are: Ability to stand higher thrust loads and pressures without dislamination, splitting, or working out of the chuck. Micarta No. 1C17 and 863 are green in color to distinguish them from 1B21 and 262 which have proved so successful on bar, rod, wire, and other small mills, and which may still be used for the radial parts of bearings on lighter pressure applications.

Financial

Continental-Diamond Fibre, including foreign subsidiaries, for quarter ended June 30, shows net loss of $21,986 after taxes, depreciation, etc., comparing with net loss of $138,454 in preceding quarter and net loss of $159,487 in June quarter of previous year.

For the 6 months ended June 30, 1933, net loss was $160,440 after taxes, depreciation, etc., against net loss of $321,861 in first half of 1932. Results from foreign subsidiaries are included in the above figures at rates of exchange prevailing during the period.

Net current assets on June 30, last, amounted to approximately $2,957,000 of which $1,063,000 represented cash and government bonds. This compares with net current assets of $3,156,000 of which $1,132,000 represented cash and marketable securities on June 30, 1932.

	1933	*1932*
Sales, less returns, etc	$872,085	$678,955
Costs and expenses	794,120	728,105
Operating profit	$77,965	*$49,150
Other income	9,763	4,245
Total income	$87,728	*$44,905
Provision for taxes	1,878	.....
Depreciation	107,836	114,582
Net loss	$21,986	$159,487

Six months June 30:

	1933	*1932*
Sales, less return, etc	$1,504,946	$1,428,252
Costs and expenses	1,460,787	1,530,783
Operating profit	$44,159	*$102,531
Other income	12,832	9,716
Total income	$56,991	*$92,815
Provision for taxes	1,878	.....
Depreciation	215,553	229,046
Net loss	$160,440	$321,861

*Loss. Results from foreign subsidiaries are included in the above figures at exchange rates prevailing during the period.

American Management Association has announced that the 4th Annual Packaging Exposition will be held at the Hotel Astor, N. Y. City, March 13-17, 1934. Bakelite, Celluloid Corp.; DuPont Cellophane, Sylvania Industrial have already engaged space.

New

Isolantite, Inc., Belleville, N. J., is marketing parts made from Mycalex through an arrangement with G. E. Mycalex is a plastic consisting of ground mica and soft glass. Besides furnishing Mycalex in molded form, with or without inserts, Isolantite will furnish it in standard sizes of bar and sheet stock to those with suitable tooling equipment for machining it. Mycalex is impervious to moisture, and certain grades are said to be especially well suited to applications in which a material having a low power factor is required. It is said to be of special interest in radio applications, where a high order of electrical stability is required in high-frequency circuits.

Mutual Sales, 310 Lakeside ave., N. W., Cleveland, is marketing a new Cellophane-surfaced fabric, known as "Doplex," which is said to be useful in making lamp shades and many other products.

Washburn Co., Worcester, Mass., is adding Catalin handles to its Androck kitchenware.

U. S. Production

Soligen driers will be made in U. S. by Std. of Cal. Advance Solvents & Chemical, N. Y. City, selling agents, announced recently lowering of prices by approximately 25%.

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Plastic Patents

Cellulose

Colored soluble cellulose carrying uniform distribution of cellulose fibres and pigment particles in the pulp. No. 1,914,489. Emile De Stuber, New York, N. Y.

Solvent for cellulose material, using a furane derivative solid at ordinary temperatures as the solvent in the composition. No. 1,914,522. Carl S. Miner to The Quaker Oats Co., Chicago.

Artificial leather made up of pad of felted sheets of gossamer-like cellulose fibre, the pad impregnated with rubber and compacted to a homogeneous mass. No. 1,915,339. A. C. Sewall to Paper Patents Co., Neenah, Wisc.

Process for ripening a cellulose ester and its products. Of interest in the hydrolysis of cellulose acetate. No. 1,916,689. George Schneider to Celanese Corp.

Process of impregnating fibre board with chemical soluble in one liquid but insoluble in said liquid mixed with another. No. 1,917,176. Alexander Winogradow, New York, N. Y.

Process of making cellulose nitrate-acylate by esterifying an acylate having less than 3 acyl groups with a nitrating agent only. No. 1,917,380. C. J. Malm and J. D. Coleman, Jr., to Eastman Kodak Co.

Process for making a cellulose nitrate-acylate, comprising three distinct steps. No. 1,917,381. C. J. Malm and C. L. Fletcher to Eastman Kodak Co.

Production of low viscosity cellulose derivatives; aliphatic carboxylic esters of cellulose treated with aqueous potassium permanganate to reduce viscosity. No. 1,917,398. C. J. Staud and T. F. Murray Jr., to Eastman Kodak Co.

Homogeneous mixtures of cellulose nitrate and acetate, dissolved in acetic acid, the dissolved material from united solutions being precipitated. No. 1,917,399. C. J. Staud and Charles E. Warren to Eastman Kodak Co.

Process for nitrating cellulose in bath with nitric oxide as the substantial nitrating agent. No. 1,917,400. C. J. Staud and J. T. Fuess to Eastman Kodak Co.

Fibrous cellulose nitrate-acylate treated to produce acetone soluble nitroacylate. No. 1,917,401. C. J. Staud and R. H. Van Dyke to Eastman Kodak Co.

Cellulose ester composition with ratios of treatment from phenyl and cresyl sulphonates. No. 1,917,405. E. R. Taylor to Eastman Kodak Co.

Coatings

Coating composition adapted to give films resistant to chalking, based on low-viscosity cellulose nitrate with damar resin, ester gum, castor oil, dibutyl phthalate, antimony oxide, solvents and diluents. No. 1,914,563. J. W. Gilbert to E. I. duPont Co.

Coating composition from cellulose nitrate vegetable oil and pigment, with solvent mixture proportioned from three ethyl agents. No. 1,915,163. Marjorie H. Morrison and Edgar H. Nollau to E. I. duPont Company.

Urea-Formaldehyde

Process for condensation products involving fusing the urea and introducing the formaldehyde in aqueous solution. No. 1, 914,957. Oscar Neuss, Germany.

Laminated

Safety glass using layers of water-insoluble vegetable protein. No. 1,915,048. John H. Clewell to Du Pont Viscoloid Co.

Laminated glass including as layers a mechanical mixture of cellulose esters and ethers. No. 1,915,085. B. C. Bren to Du Pont Viscoloid Co.

Process and apparatus for applying plastic calking paste to the grooved edge of laminated glass. No. 1,916,748. T. G. Wright to Duplate Corp.

Bonded composite articles from wooden plies with dispersion of a resin and a liquid non-solvent, treated by heat and pressure. No. 1,917,020. Harry M. Dent to General Plastics, Inc.

Machinery

Apparatus for making laminated glass in sandwich form, using a single rubber bag as vacuum or a plurality of bags. No. 1,914, 392. A. G. Worrall to Louis J. Kolb trading as Safety Glass Co.

Sheeted laminated glass layered with water-insoluble vegetable protein. No. 1,915,048. John H. Clewell to duPont Viscoloid Co.

Apparatus for laminating materials, with rolls for sheets, edge guides, gathering guide, pressure rollers and winding beam. No. 1,915,221. M. D. Fitzgerald to Fitzgerald Mfg. Company, Torrington, Conn.

Mold press with platen-ejection of core and self-opening side plates for removal of molded article. No. 1,916,368. Paul O. Gunkel to Joseph Stokes Rubber Co., Trenton, N. J.

Transfer pressure method of molding potentially reactive infusibly thermosetting resinous material, with heating and hydrostatic pressure applied progressively. No. 1,916,495. Louis E. Shaw to Joseph Stogdell Stokes, Spring Valley Farms, Pa.

Miscellaneous

Collapsible celluloid tube with rounded top surface to prevent lateral cracking of the celluloid. No. 1,914,584. Warren S. Sillcocks to Lusteroid Container Co., Maplewood, N. J.

Flexible sound record of cardboard body carrying layer of heat-hardened resorcinol condensation product and a plasticizer which forms a solid solution; arranged so that tone grooves lie wholly in this hardened product. No. 1,915,282. Hal T. Beans, to Durium Products Corp., N. Y.

Method of making phonograph records, as above described. No. 1.915,384. Joseph Reilly and Hal T. Beans, to Durium Products Corp., N. Y.

Method of refining crude phthalic anhydride through injection of high-boiling organic acidic reagent at boiling temperature, and volatilization. No. 1,916,657. Courtney Conover to Monsanto Chemical Co., St. Louis.

Process for molded articles from plastic compositions, involving the coating of mold with chemically impregnated substances to be removed by higher temperatures. No. 1,917,451. Lebach & Wirth to Saureschutz Gess., Germany.

Cartridge with plastic waterproof coating, for dynamite blasting. No. 1,517,540. David E. Pearsall to Ensign-Bickford Co. Simsbury, Conn.

Shaping celluloid articles by method of making tubes from blocks of thermoplastic material without waste. No. 1,915,936. Evarts G. Loomis to Evarts G. Loomis Co., Newark, N. J.

Phenol

Plastic product from heating a fibrous carbohydrate-containing vegetable material with a phenol and a mineral agent in repeated treatments until all water soluble substances and uncombined acids are removed. No. 1,917,038. Lemuel B. Jones, Petersburg, Va.

Phenol-furfural resin with accelerator of basic substance that neither combines with nor yields aldehydic groups, and a methlene-yielding body. No. 1,917,248. Filed 1927. N. D. Hanson to Bakelite Corp.

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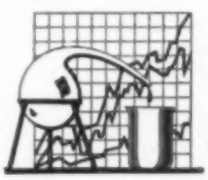

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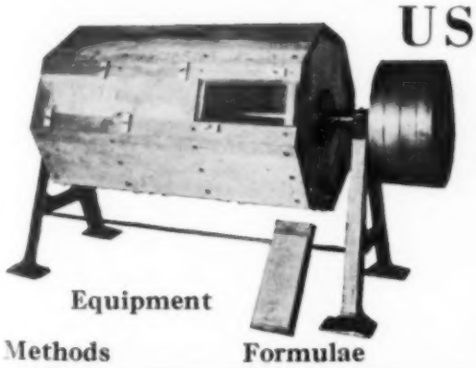

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No. 1,917,413. Johann K. Wirth, Berlin-Wilmersdorf, Germany.

Plastic mixture containing resitols, from volatilizing undesired constituents of soluble and fusible phenol-aldehyde conversion product, with conversion of resol, to resitol, to resite. No. 1,917,713. R. H. Hessen, Bautzen, Germany.

Resins

Organic polybasic acid, polymerized alcohol, fatty oil acid and a polymerized coal tar hydrocarbon resin heated together to a synthetic resin. No. 1,915,544. C. G. Moore and M. Zucker to Glidden Co., Cleveland.

Artificial resinous substance from heating polyhydric alcohol, organic polybasic acid and a non-hydroxylated fatty acid in a-closed and b-open vessels. No. 1,916,295. William Baird to Imperial Chemical Industries, London, England.

Highly viscous, polymerized, transparent, resinous material from heat action upon divinyl ether. No. 1,916,423. Harold Hibbert, Montreal.

Synthetic resin and products thereof, from the reaction of triethanolamine with an organic carboxylic acid. No. 1,918,222. L. Weisberg and W. F. Greenwald, to Weisberg & Greenwald, N. Y.

Pyroxylin

Method of compositing pyroxylin in two series of applications of a color-body to a pyroxylin sheet, attaching by heat and pressure to avoid shift in color parts, spreading a second sheet for simultaneous treatment, the pressure being exerted in such manner as to bond the color-body to both sheets by interpenetration and to leave this decorative part visible through one of the sheets. No. 1,916,880. Ford C. Close, N. Y.

Abrasives

Bonded aluminous abrasive with grains set in boro-silicate glass. No. 1,918,312. C. E. Wooddell to the Carborumdum Co., Niagara Falls, N. Y.

Cellulose ester in solvent mixed with abrasive material as method for an abrasive paper. No. 1,918,418. Carl Munch, Germany.

Grinding wheel with adjustable centering hub. No. 1,920,204. T. Larsson, to Norton Co., Worcester, Mass.

Casein

Method of transforming casein into an ivory-like mass by solvent dissolution and addition of a polysulfide. No. 1,922,007. R. Zellmann to Chemische Fabrik von Heyden, Radebeuhl, Germany.

Cellulose

Nitric acid-lower aliphatic acid process for esters, without use of esterification catalyst. No. 1,918,251. Camille Dreyfus, to Celanese Corporation of America.

Treatment of sugar cane fibre for high alpha, low ash content cellulose. No. 1,918,250. J. J. de la Roza, Tuinicu, Cuba. (Tuinucu).

Method for making hollow bodies from liquid cellulose by dipping into solutions and coagulating in a precipitating bath. No. 1,918,383. E. Czapek & E. Bauer, Germany.

Textile cellulosic material 98-99 alpha, showing viscosity of 2. No. 1,919,329. C. Henningsen, to duPont Rayon Co.

Process for conversion products from cellulosic materials. No. 1,919,623. Henry Dreyfus, England.

Shredded mercerized cellulose pulp conditioned for nitration. No. 1,919,962. M. O. Schur & B. G. Hoos to Brown Co., Maine.

Substantially pure alpha cellulose from eight selected canes. No. 1,920,239. A. B. Bori & J. M. Estape, Havana, Cuba.

Crotyl cellulose and crotyl cellulose compositions. No. 1,920,297. H. B. Dykstra to duPont Co., Delaware.

New process for preparing cellulose esters. No. 1,920,306. J. F. Haskins to Du Pont Rayon Co.

Method of connecting a collapsible cellophane tube to a metallic dispensing terminal. No. 1,921,021. G. W. Bungay to Aluminum Co. of America.

Simultaneous bleaching and clearing of cellulose acetate by electrolysis. No. 1,921,492. C. S. Webber & C. J. Staud to Eastman Kodak Co.

Coherent plastic mass from dispersing cellulose acetate. W. B. Pratt & R. T. Halstead, Boston, to Dispersions Process, Inc. (No. 1,921,582).

Alkaline cyanide process for freeing cellulose esters from metallic impurities. No. 1,921,949. S. E. Sheppard to Eastman Kodak Co.

Process for reclaiming dyed cellulose nitrate film scrap. No. 1,921,963. W. J. Weyerts & K. C. D. Hickman to Eastman Kodak Co.

Process for esterifying cellulose while maintaining its structure. No. 1,922,287. R. Haller & A. Ruperti, to Society of Chemical Industry, Basle.

Alkali metal sulfide solution process for treating vegetable fibrous materials. No. 1,922,308. Leon Lilienfeld, Vienna.

Coating of triacontane with plasticizer and resin to render films and cellulose articles impervious. G. W. Seymour to Celanese Corp. No. 1,918,294.

Coatings

Shellac-pigment composition, four elements. No. 1,918,804. W. H. Gardner to U. S. Shellac Importers' Assn., N. Y.

Transparent cellulose acetate coating or film, for glass surfaces. No. 1,919,517. K. Konishi & S. Kodama, Tokyo.

Production of lacquers, artificial masses and solutions of their constituents. No. 1,919,727. Otto Jordan to I. G. F., Frankfort.

Coating composition containing a siccative. No. 1,920,160. H. A. Bruson to Resinous Products & Chemical Co., Philadelphia.

Esterifying process without H_2SO_4, and with acids free from certain fatty acid components of China wood oil. No. 1,920,980. C. E. Gauerke to E. I. duPont Co., Wilmington.

Free flowing surface ornamenting composition, of cellulose derivative, plasticizer and highly volatile solvent. No. 1,922,548. H. F. Mattin, to Joseph H. Mayer Bros., Brooklyn.

Coating material of porous absorbent base carrying a dried mixture of an emulsion of pyroxylin varnish. No. 1,922,936. H. V. Dunham to Casein Mfg. Co. of America, N. Y.

Furfural

Utilizing differing reaction mixtures with steam, for the manufacture of furfural; with process for continuous formation and removal of same from oat hulls. No. 1,919,877-8. Harold J. Brownlee to Quaker Oats Co., Chicago.

Laminated

Machine for making laminated fibrous pulleys having metallic cores in laminated two-piece fibrous body. No. 1,919,694. George R. Fox, St. Louis, Mo.

Process on laminated glass to prepare it for sealing, through solvent action on marginal portions. No. 1,919,757. G. B. Watkins to Libbey-Owens-Ford Glass Co., Toledo.

Laminated parchmentized material for rigid structural material with two fibrous layers. No. 1,920,081. Robert John, N. Y.

Laminated glass and process, with binder of condensation resin carrying glycerol ester of a fatty acid. No. 1,920,619. John C. Zola, to Duplate Corp., Delaware.

Process for laminated glass involving final action of a fluid under pressure. No. 1,921,612. F. Frazer & G. B. Watkins to Libbey-Owens-Ford Glass Co., Toledo.

Laminated box, with method of delivering box material from rolls, feeding spaced strips so as to form bottom and walls. No. 1,922,506. John S. Stokes to Stokes & Smith Co., Phila. (Also No. 1,919,604).

Sheeted cellulose nitrate plastic uniformly moistened, with water-soluble adhesive, as process for laminated glass. No. 1,922,893. J. W. Kamerer & E. L. Fix to Duplate Corp., Del.

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Classified Advertising

Rates for classified advertising, per issue, are $1.00 for 20 words or less; 5c for each additional word. 10c for forwarding mail if box number is used. Payment must be enclosed with order, which must be received by publishers no later than the 20th of preceeding month.

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WANTED—A small Hydro Pneumatic accumulator with compressor but no pump.
Reply to Box 611 Plastic Products.

•

WANTED: Information as to whereabouts of Abraham or Al Feldman. A celluloid cutter by trade.
Reply to Box 500 Plastic Products.

•

WANTED: The following copies of PLASTIC PRODUCTS: January, February, March and May 1927; January, March, April and October 1930; January, March and December 1931.
Box 501 Plastic Products.

To fill your most exacting requirements for custom molding and fabricating, come to the oldest and finest plant in the world. . . . .

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All Types of Materials

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NEW YORK • CHICAGO
DETROIT • CLEVELAND
HOLLYWOOD, CAL.

ARC AMERICAN RECORD CORPORATION
Scranton, Pa.

And Now, in Closing:—

We have to report that one of the youngest generation, asked to define NRA, said it was a Nation Resenting Adversity.

What we really need, in this business, is an Industrial Administrator for writers and authors—all writers, you see, aren't authors. In other words, the profession needs a Code for Nrators.

Up near the Canadian border is the town, Lyndon, Vermont. Its only factory is one bearing the suggestive title "Our Husbands Manufacturing Company." We will refrain from making the obvious comments, contenting ourselves with presenting this as a curiosity item.

Speaking of Canada, we are reminded of the visitor there who, examining a bottle of Hiram Walker, discovered the cap. "It's molded!" he exclaimed. "I don't see why," protested his host, "it was nice and fresh when I bought it!"

We are finally making use of the lighter given us for Christmas. Scratching matches on the bottom of our shoes tore our socks.

Many employers in the plastics industry have been bewildered by the protests with which their workmen greeted the use of the NRA Code. It seemed understandable if an employee objected to a 40-50% pay reduction—such as many of the skilled workmen have had to take under the codes. But it did not seem the ordinary plant worker should be incensed over a small reduction that would enable the re-employment of many of his friends.

Unfortunately, the unskilled laborer has read into the "collective bargaining" clause a meaning that never was, never intended. The phrase, to many, means "strike," and the rapacity of the labor unions has given it this definition. The Administration has so far acted with commendable speed in the settlement of labor troubles in other industries. It has shown that it is on the side of the worker—within reason, but that it is the worker, after all, who must bear the greater burden in a re-employment drive.

But perhaps the most delicate question of all is the one surrounding price increases, industrial or retail. The larger retailers have been inclined to caution, but the increased price of many standard products has put the purchaser on the defensive. He is beginning to feel that he is caught between the two fires of decreased wages and rising costs, and his whole-hearted desire to "do his part" cannot surmount this economic obstacle over which he has no control.

Industries, on the other hand, can generally protect themselves against exorbitant price increases on the part of their suppliers. In the plastics field, two methods have been followed. There has been a blanket increase, such as the 15% rise announced by the Reynolds Spring Company—the first, we believe, to do this—and there has been an entirely new quotation on every job, based on refigured costs. Both methods have been widely followed, but neither one has obtained universal success. In the initial period of this inflationary movement, such problems must be handled with infinite caution.

Do you know the difference between extrusion, transfer and injection molding? How much—or little—do you know about any of them? Watch *Plastic Products* for an article on the method employed with phenolics in this country.

And all that brings to mind the over overheaded plant whose NRA sign bore the legend "We do our partners."

We called at a large lacquer plant recently to see the president. Our entrance was momentarily, but effectually, blocked by an office boy who wanted to know if we were a salesman, bill collector or friend. We decided we might be all three—we often are—and said as much. "Well," shot back the boy, "he's in conference. He's out of town. Step right in."

There are those who claim that this 3.2 beer is actually intoxicating, but we believe otherwise. A Dutchman of our acquaintance sat up all night drinking it, and there were no results. Unless, of course, he got intoxicated in German and we couldn't understand it.

In recent years, the Chemical Exposition has been the one outstanding meeting ground for plastic exhibits. This year the Exposition is to be held later than usual—during the week of December 4—and already there are more exhibitors from this industry. The larger companies will be represented, as in past years, but many of the smaller concerns have also decided to be present. Unfortunately, none of the molders have booked space to date with the exception of General Electric. A progressive Molders' Association could present an interesting and profitable display. *Plastic Products* will have space on the ground floor.

The *Durez Molder* for September has an article on style which is well worth quoting for the benefit of our readers who purchase plastic materials:

"With the return of better days, increased employment and more even distribution of compensation to the worker, the buyers may more readily be persuaded to buy, not, however, at lower prices, for the price trend is upward. Therefore, the need for greater appeal through restyling.

"People want style and appearance. They want convenience. Manufacturers are revamping their lines, thinking up new devices, new pleasures, new conveniences with the awakening of this new era of National Recovery. The buyers are of a new courage and they are not going to look for lowered prices, but just the full value of their dollar.

"They will not buy obsolescences, and the sewing machine with the foot tread will no longer do. The washing machine is being revolutionized and those of tomorrow will be more compact and will have many additional conveniences. Small motor driven lawn mowers will replace the hand-pushed, noisy type of today. The shaving brush is having a hard time of it, and will eventually go the way of the old-time razor, just as Morris Chairs, cuspidors, high shoes and innumerable other items, satisfactory in their day, have had to join the discard.

"The New Deal and the National Recovery Act, are encouraging manufacturers to venture the new. In this era of awakening, plastics will play a greater part than ever before."

Continuing our custom, we award this month's orchids to:

Geo. Scribner, for his election, as reported elsewhere.

General Plastics, for their new N. Y. office.

and we award a wilted dandelion to:

those in favor of an independent molders' association (second award).

Herbert Chase and L. E. Shaw for incorrectly gating some of the pieces illustrating the extrusion article in the *Molder*.